

contain: (i) a complete statement of all opinions the witness will express and the basis and reasons for them;

(ii) the facts or data considered by the witness in forming them; (iii) any exhibits that will be used to summarize or support them; (iv) the witness's qualifications, including a list of all publications authored in the previous 10 years; (v) a list of all other cases in which, during the previous 4 years, the witness testified as an expert at trial or by deposition; and (vi) a statement of the compensation to be paid for the study and testimony in the case.

- *Federal Rule of Civil Procedure 26(a)(2)(C):* Witnesses Who Do Not Provide a Written Report. Unless otherwise stipulated or ordered by the court, if the witness is not required to provide a written report, this disclosure must state: (i) the subject matter on which the witness is expected to present evidence under Federal Rule of Evidence 702, 703, or 705; and (ii) a summary of the facts and opinions to which the witness is expected to testify.

Bastiaan Cornelissen, Ph.D., P.E
Spectrum Forensics
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(303) 963-9650

Dr. Cornelissen is an expert forensic engineer who has been asked to review the events surrounding Mr. Moore's fall and determine the cause of Mr. Moore's fall and the cause of the device failures associated with the fall. Dr. Cornelissen is a licensed professional engineer specialized in forensic analysis.

It is believed that Dr. Cornelissen will testify based upon his training and experience, as well as a review of the relevant information outlined in his report and a review of the material generated during the discovery phase of this litigation (including those items described in his report). Further, his opinions are based upon his review of information gathered during multiple joint inspections and investigations and his interview with Mr. Moore and consultation with Mark Russell, P.E., a mechanical engineer within his firm.

The general substance of Dr. Cornelissen's mental impressions and opinions are set forth in his report (attached). Plaintiff incorporates by reference the deposition of Dr. Cornelissen if and when taken, and any additional/supplemental reports he may provide.

Dr. Cornelissen's resumé, fee schedule and list of testimony are provided (attached) and incorporated by reference. Plaintiff incorporates by reference Dr. Cornelissen's report for additional information about his topics and substance of his anticipated testimony and the materials upon which he relied.

Mark Russell, Pd.D., P.E.
Spectrum Forensics
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Dr. Cornelissen is an expert engineer who has been asked to review the events surrounding Mr. Moore's fall and determine the cause of the device failures associated with the fall, and the fall mechanical engineering and manufacturing associated with the Lad Saf X3 and the feasible alternative designs. Dr. Russell is a licensed professional engineer specialized in forensic analysis and mechanical engineering.

It is believed that Dr. Russell will testify based upon his training and experience, as well as a review of the relevant information outlined in his report and a review of the material generated during the discovery phase of this litigation (including those items described in his report). Further, his opinions are based upon his review of information gathered during multiple joint inspections, the mechanical analysis of multiple exemplar devices and consultation with Dr. Cornelissen.

The general substance of Dr. Russell's mental impressions and opinions are set forth in his report (attached). Plaintiff incorporates by reference the deposition of Dr. Russell if and when taken, and any additional/supplemental reports he may provide.

Dr. Russell's resumé, fee schedule and list of testimony are provided (attached) and incorporated by reference. Plaintiff incorporates by reference Dr. Russell's report for additional information about his topics and substance of his anticipated testimony and the materials upon which he relied.

J. Nigel Ellis, Ph.D., CSP, P.E, CPE
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Dr. Ellis earned three degrees at the University of Manchester, including a doctorate in chemistry and he is a Registered Professional Safety Engineer in Massachusetts and California, a Board Certified Safety Professional and a Board Certified Professional Ergonomist, (Human Factors).

Dr. Ellis has more than 40 years of safety engineering experience. He is the CEO and founder of Dynamic Scientific Controls (DSC) and President of its division Ellis Fall Safety Solutions. Based on this expertise Dr. Ellis has performed fall hazard assessments in hundreds of facilities and construction sites and has been retained as an expert witness in about 1000 fall related cases nationwide.

Dr. Ellis is a founding member on American National Standards Institute ANSI Z359 the former chairperson ANSI Z359.2 committee and is a contributor to other ANSI committees, as well as various ASTM committees. These committees prepare and revise the nation's fall protections standards. Dr. Ellis is a board member of the International Society for Fall Protection (ISFP) and is a past chairperson of the International Safety Equipment Association Fall Protection Group.

It is believed that Dr. Ellis will testify based upon his training and experience, as well as a review of the relevant information outlined in his report and a review of the material generated during the discovery phase of this litigation (including those items described in his report). Further, his opinions are based upon his review of information gathered during multiple joint inspections and investigations and his interview with Mr. Moore and consultation Dr. Cornelissen.

The general substance of Dr. Ellis's mental impressions and opinions are set forth in his report (attached). Plaintiff incorporates by reference the deposition of Dr. Ellis if and when taken, and any additional/supplemental reports he may provide.

Dr. Ellis's resumé, fee schedule and list of testimony are provided (attached) and incorporated by reference. Plaintiff incorporates by reference Dr. Ellis's report for additional information about his topics and substance of his anticipated testimony and the materials upon which he relied.

DATED: October 14, 2020

Respectfully submitted,

THE ROBERT PAHLKE LAW GROUP

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ATTORNEYS FOR PLAINTIFFS

CERTIFICATE OF SERVICE

I hereby certify this 14th day of October 2020 that a copy of the foregoing document was filed electronically in compliance with Local Rule CV-5. Therefore, this document was served on all counsel via electronic service. Local Rule CV-5.

/s/ Kyle Long
Kyle J. Long

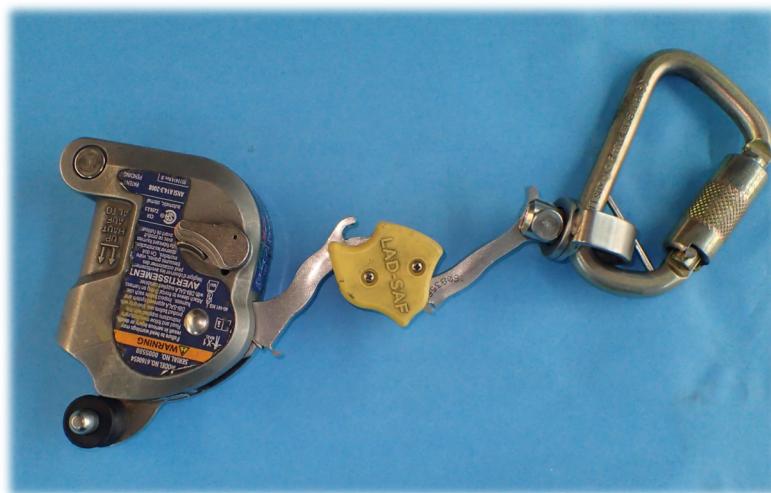


Justin Moore

Fall Incident Investigation

Prepared For
KYLE J. LONG

The Robert Pahlke Law Group





October 14, 2020

INITIAL REPORT

The Robert Pahlke Law Group
Attn: Kyle J. Long
2425 Circle Drive, Suite 200
Scottsbluff, NE 69361

SUBJECT: MOORE FALL INCIDENT INVESTIGATION
SF20-108

Date of Loss: June 8, 2017
Case No.: 6:19-cv-00038-C
Clients: Justin and Judith Moore

Dear Mr. Long:

Per your request, Spectrum Forensics, LLC (Spectrum) investigated equipment involved in a June 8, 2017 fall incident at wind turbine tower in Mills County, TX. Justin Moore was injured when he fell while descending a ladder in the interior of the tower.

Background

The subject June 8, 2017 incident occurred in Tower 41 of a wind turbine park near Goldtwaihe, TX. The wind turbine park is owned and operated by Invenergy, LLC ("Invenergy"). At the time of the incident, Mr. Moore was employed by Invenergy to perform maintenance work at the park.

Tower 41 was equipped with an Ibex Climb Assist 1000 ("Ibex") system that provides up to 125 lbs. of assist to persons climbing or descending the interior ladders. This system was manufactured by Power Climber Wind (a division of SafeWorks, LLC). Mr. Moore was using fall protection equipment that included a LAD-SAF X3 cable clamp manufactured by DBI.

Incident Description

As Mr. Moore started to descend the interior ladder near the very top of the tower, the polymer belt of the Ibex system broke. The sudden loss of more than 100 lbs. of weight support caused Mr. Moore to lose his grip on the ladder and begin to fall. Mr. Moore fell around 20 feet before the LAD-SAF X3 engaged the wire safety rope and brought him to stop. The abrupt stop after an extended free-fall generated high rates of deceleration and associated high forces on Mr. Moore and reportedly resulted in injuries to his back, shoulder, and brain. Invenergy terminated Mr. Moore when he was unable to return to his regular duties and suitable alternative duties reportedly could not be made available.

Investigative Approach

Spectrum inspected the loss location and elements of the Ibex and wire safety rope system at the Invenergy wind turbine park near Goldtwaithe, TX on October 6, 2020. Spectrum also participated in joint non-destructive and destructive laboratory examinations at Engineering Systems, Inc. (“ESI”) on August 19, 2020 and October 7, 2020. Product literature and other provided materials were reviewed. Spectrum inspected and tested several older and recent-manufacture LAD-SAF X3 devices taken from manufacturer-sealed boxes. Two of these devices was disassembled for inspection and measurement. Although only a selection of photos taken during multiple inspections have been reproduced in this report, and only specific sections of documents have been referenced, all documents and photographs in the Spectrum file for this project have been reviewed and considered in the course of this investigation.

Documents Reviewed

Documents reviewed in the course of this investigation include:

- Incident Investigation Report Form, GDW Incident 141 6-8-17 JMoore
- Plaintiff’s Amended Complaint, Case 6:19-cv-00038-C, June 13, 2019
- Deposition, Justin Moore, September 24, 2020
- LAD-SAF User Instructions, DBI Sala, 2016
- LAD-SAF Failure Modes and Effects Analysis
- Discovery Documents, SafeWorks
- Discovery Documents, DBI
- Ibex Climb Assist Specifications, Power Climber Wind
- Splicing Procedure, Power Climber Wind
- Operators Manual, Ibex 1000 Series Climb Assist System, Power Climber Wind, Revision A, December 20, 2008
- Operators Manual, Ibex 1000 Series Climb Assist System, Power Climber Wind, Revision E, January 26, 2012
- Brochure, Ibex 1000 Series Climb Assist, Power Climber Wind

Site Inspection

A photograph of the base of the T-41 wind turbine tower involved in the June 8, 2017 incident is shown in Figure 1. The tower was reportedly erected in or around 2013.



Figure 1. Base of T-41 wind turbine tower involved in June 8, 2017 incident.

The failed polymer belt from the Ibex climb assist system and the wire safety rope were removed and replaced following the incident. A photograph of the configuration of the replacement components is shown in Figure 2.



Figure 2. Replacement polymer belt (blue) of Ibex climb assist system. The wire safety rope is visible immediately adjacent to the polymer belt behind the ladder.

The original polymer belt and the wire safety rope (and associated attaching hardware) were initially retained by Invenergy. Short lengths of the polymer belt were cut off and delivered to ESi for the initial August 19, 2020 laboratory exam. The remainder of the polymer belt and the wire safety rope and attaching hardware (shown in the photograph in Figure 3) were transferred from Invenergy to Spectrum during the October 6, 2020 site inspection and transferred by Spectrum to ESi at the start of the October 7, 2020 laboratory exam.



Figure 3. Polymer belt remnants, wire safety rope, and attaching hardware transferred by Invenergy to Spectrum on October 6, 2020.

A welding rig of the type used to fuse lengths of the polymer belt during installation of the Ibex climb assist system was made available by Invenergy for inspection as shown in the photograph in Figure 4. No records were available to establish whether or not this specific welding rig had been used to fuse the belt in Tower T-41 in 2013.

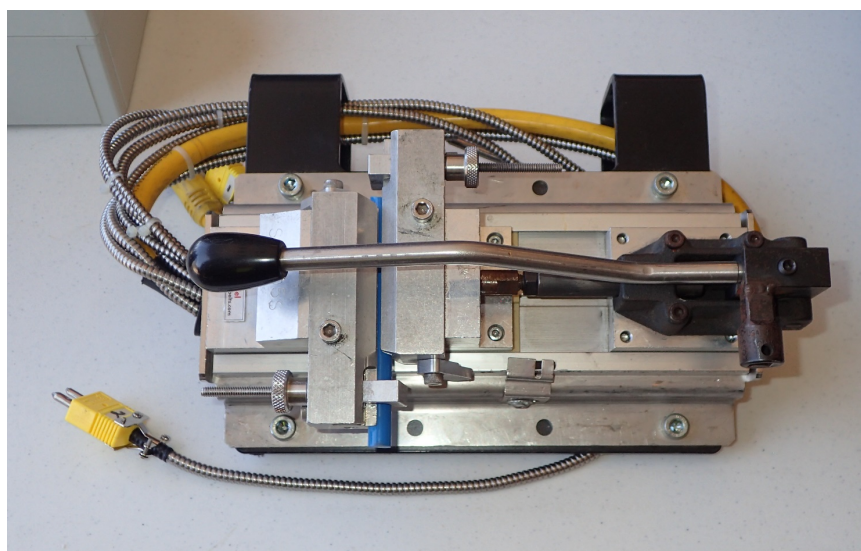


Figure 4. Welding rig of the type used to fuse ends of polymer belt during installation of the Ibex climb assist system in Tower T-41 in 2013.

LAD-SAF X3 Intended Operation

The subject LAD-SAF X3 cable clamp incorporates a cam that is designed to clamp down on the wire safety rope in the event of a user fall. In routine use, the cam rotates to a disengaged position to allow the cable clamp to freely slide along the wire safety rope as the user climbs or descends. Moving the energy absorber into a raised position relative to the main body of the LAD-SAF X3 allows the cam to fall away from the wire safety rope. If a fall occurs, the cam is expected to move into a wire safety rope clamping position and arrest the fall whether the energy absorber is in the raised or lowered position. The design envisions that no user action is required to deploy the wire safety rope clamping function of the LAD-SAF X3 in the event of a fall.

Laboratory Analysis

The fractured ends of the failed polymer belt from the Ibex climb assist system are shown in the photograph in Figure 5. Excess braided core material and remnants of flash that had been partially trimmed away (shown in the photographs in Figure 6) indicated that the belt failed in the region where the free ends had been fused (welded) together during initial installation.



Figure 5. Fractured ends of failed polymer belt from Ibex climb assist system.

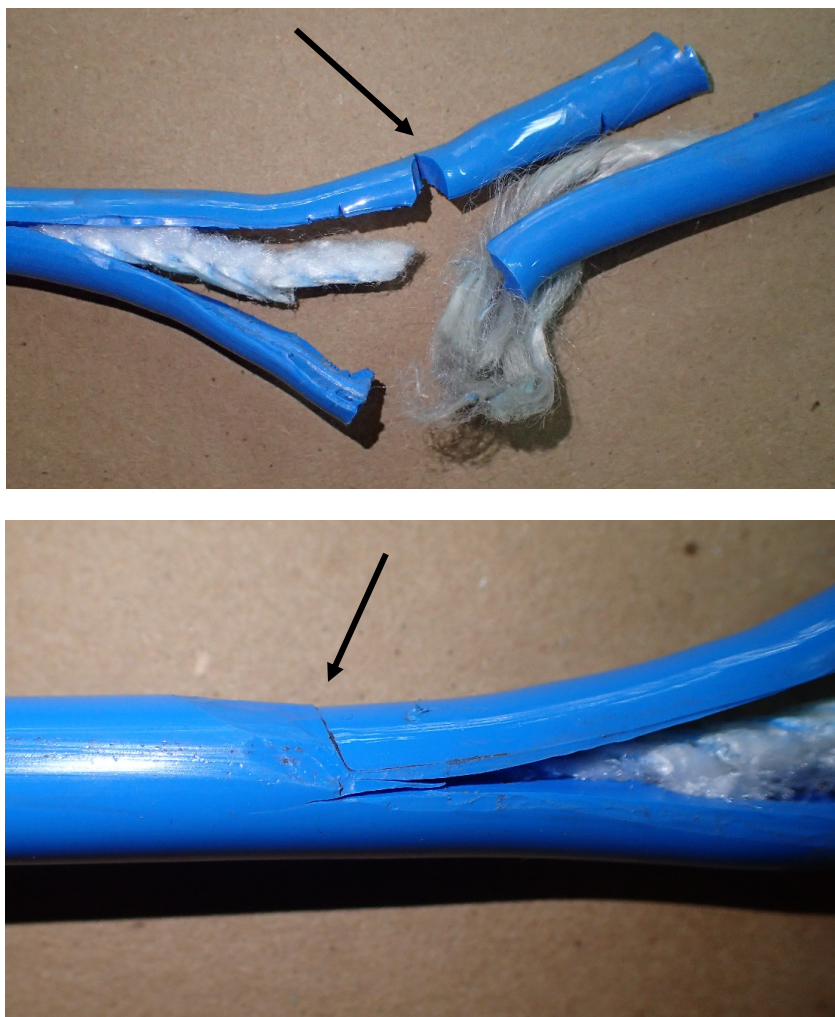


Figure 6. Fractured ends of failed polymer belt from Ibex climb assist system showing excess braided core material (top) and evidence of flash trimming (bottom) indicative of a welded connection.

A series of parallel transverse cracks (shown in the photographs in Figures 6 and 7) indicated that the welded region had likely begun to exhibit visible signs of a developing failure weeks or months before the final catastrophic separation of the polymer belt occurred.

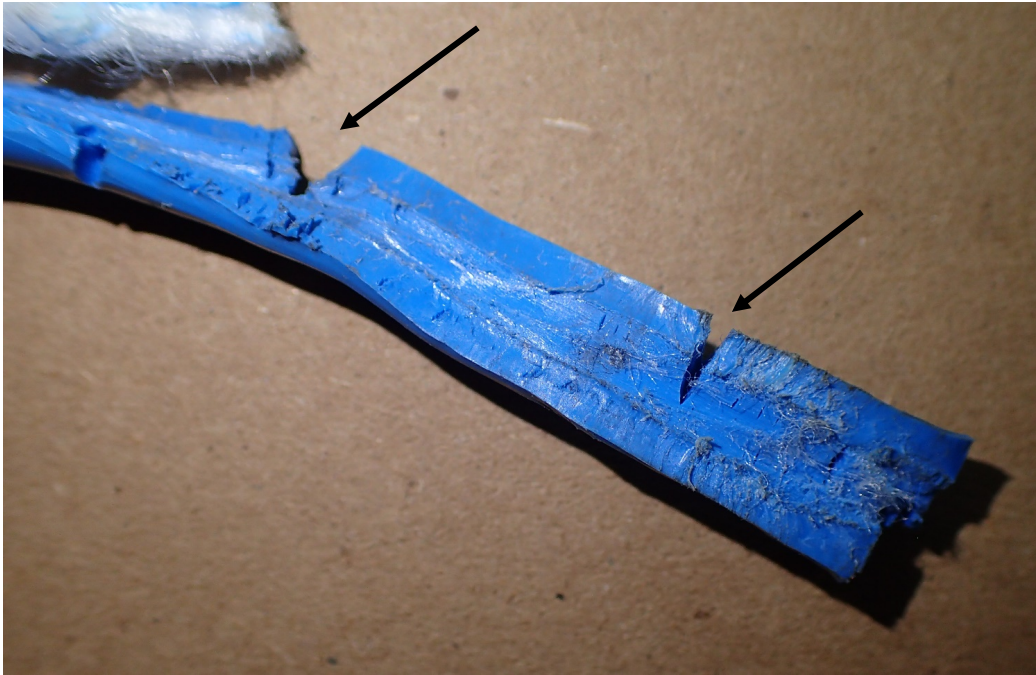


Figure 7. Parallel transverse cracks in failed polymer belt of Ibex climb assist system indicative of progressive failure development in fused region.

The wire safety rope that had been in use at the time of the June 8, 2017 incident showed kinking (depicted in the photograph in Figure 8) typical of high-energy clamp activation approximately 25 feet from the top attachment point. This distance is consistent with the fall distance reported by Mr. Moore. The wire rope was approximately 3/8 inch in diameter and although the exact number of wires in the individual strands could not be ascertained, appeared to consist of seven identical braided wire strands in a typical 7x19 configuration.



Figure 8. Kinking typical of high-energy cable clamp activation at approximately 25' from top attachment.

The subject LAD-SAF X3 cable clamp (shown in the photographs in Figure 9) was unremarkable other than for the deployed energy absorber.

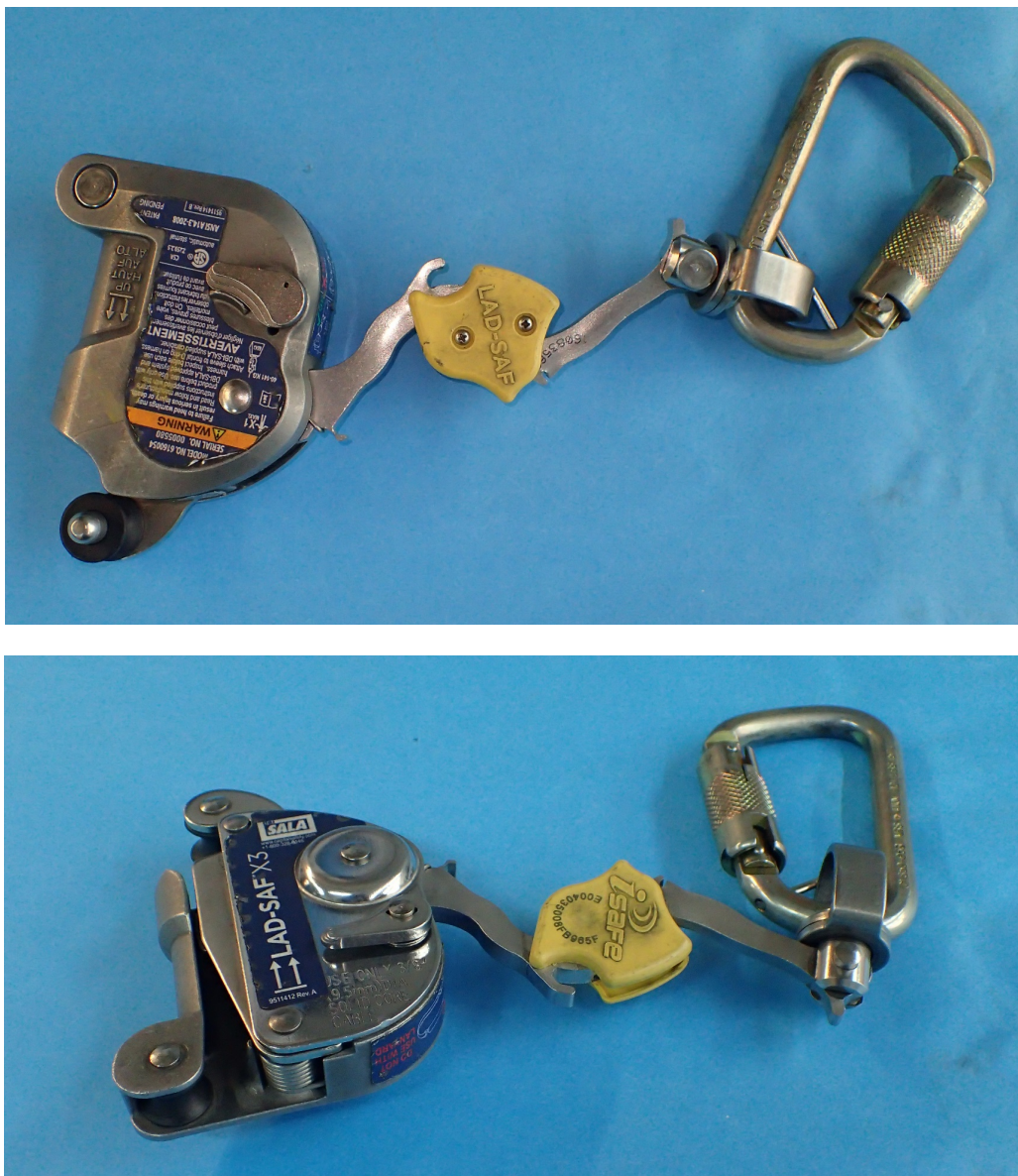


Figure 9. Subject LAD-SAF X3 showing deployed energy absorber.

Even in its deployed condition, the subject LAD-SAF X3 passed typical pre-climb inspections mandated by DBI such as having the cam move into the clamp position with the device laid flat on the table and shaking the device to confirm that the cam moves freely. It also passed typical pre-climb inspections such as moving freely up and down the wire safety rope when moved at a modest speed with the energy absorber in the up position, and having the cam clamp down when the device was allowed to free-fall along a pretensioned wire safety rope (albeit at varying distances of up to a foot or so).

However, two distinct failure modes were noted during laboratory testing. First, when the device was either allowed to free-fall or manually accelerated as fast as possible down the pretensioned wire safety rope with the energy absorber in the up position, the cam failed to arrest a fall over the approximately five-foot test section of wire safety rope. Second, with the energy absorber facing the user in the up position, exerting a sideload to the user's left on the energy absorber caused the cam to lock in place even when the device was inverted. Releasing the sideload resulted in the cam falling into the clamping position.

Disassembly of the LAD-SAF X3 cable clamp showed that all components were present and in position. No individual component failures were noted. The energy absorber and the cam were separated only by a white polymer washer, and as shown in the photographs in Figure 10, rotated on red polymer bushings around the same stepped shaft. Comparison of the disassembled subject cable clamp with a disassembled contemporaneous exemplar taken from a manufacturer-sealed box showed that the subject cable clamp had not been modified in any way.



Figure 10. Disassembly of subject LAD-SAF X3 showing red polymer bushings at center of rotation for energy absorber (top) and cam (bottom); the cam and energy absorber rotate on the machined shaft shown in the middle of the lower left image.

Engineering Analysis

The June 8, 2017 fall incident that injured Mr. Moore was initiated by the failure of the polymer belt of the Ibex climb assist system. The belt failure occurred at the location where the free ends of the belt were fused together during initial assembly of the system in 2013. The failure of the belt caused a sudden loss of more than 100 lbs. of weight assistance, which in turn caused Mr. Moore to lose his grip on the ladder he was descending. The polymer belt runs the full height of the wind turbine tower and is approximately 600 feet in length.

It is not known where along the height of the T-41 tower the fused region was located at the time of failure. The fractured ends of the failed belt show signs of cracking that had developed over a period of time prior to the final catastrophic failure. Approximately one month after Mr. Moore's fall, SafeWorks issued guidance for users to inspect the welded region before every climb. Realistically, this would require that the welded region be clearly marked so that it could be located in a reasonable amount of time under the existing lighting conditions in the tower.

Welded regions are logical locations for in-service failure. Welds made under field conditions as opposed to laboratory conditions have a foreseeable increased risk of sub-optimal preparation and construction and will therefore be at an increased risk of failure compared to the bulk belt material. Multiple field reports of belt failures at weld locations confirm this hypothesis. SafeWorks' failure to instruct users to perform pre-climb inspections of the weld locations in the polymer belt rendered the Ibex climb assist system defective and unreasonably dangerous. Such instructions would have been feasible when the Ibex system was developed and manufactured and should have been provided in the User Inspections section of the Operators Manual.

Mr. Moore's injuries appear to be consistent with the high deceleration rates and attendant high forces he sustained due to the delayed deployment of the LAD-SAF X3. Mr. Moore fell approximately twenty feet before the cam in the LAD-SAF X3 suddenly engaged the wire safety rope. At the end of a 20-foot free-fall, Mr. Moore was falling at approximately 36 feet per second. If the stopping distance after deployment of the LAD-SAF X3 was approximately one foot, Mr. Moore would have experienced an average whole-body deceleration of approximately 20 G's, which would subject him to forces on the order of twenty times his body weight. Peak deceleration would be approximately twice the average deceleration, and local decelerations due to whipping of the head, neck, and limbs would likely exceed that number.

The LAD-SAF X3 cable clamp incorporates a moving cam that is designed to clamp down on the wire safety rope in the event of a user fall. The cam has to rotate around the machined shaft to clamp the wire safety rope in the event of a fall. A red polymer bushing inserted into the center opening of the cam is intended to facilitate rotation around the machined shaft. An energy absorber attached to the cable clamp is intended to increase the distance over

which the user comes to a stop (and thereby reduce deceleration rates and forces) after the LAD-SAF X3 arrests on the safety wire rope.

The cam can move into clamping position either by moving the energy absorber down or by inertial movement of the cam during a fall. In theory, inertial movement during a fall should be sufficient to move the cam into clamping position even if the energy absorber remains in the raised position. A spring is provided between the cam and the cable clamp body to help overcome the weight of the cam and facilitate upward movement during a fall. However, informal laboratory testing showed that the cam does not reliably engage the wire safety rope if it is accelerated downward with the energy absorber in the raised position.

Testing of the cable clamp off the wire safety rope shows that the cam rotates into the clamping position with relative ease even under modest downward acceleration. However, when in position on the wire safety rope, the LAD-SAF X3 did not reliably engage if the downward acceleration occurred while the energy absorber was in the raised position. This observation indicates that when the cam rotates to contact the wire safety rope, the friction between the rope and the gripping surface of the cam is insufficient to pull the cam tighter into the rope. If a lateral force is applied to the energy absorber while it is in the raised position, impingement on the cam can entirely prevent motion of the cam (and therefore, engagement of the cam with the wire safety rope) under fall conditions.

Typical engineering practice during design of components is to perform a Failure Modes and Effects Analysis ("FMEA") to determine how and why a device might malfunction under conditions of normal use and reasonably foreseeable misuse. The FMEA assigns a score to each potential failure mode based on the anticipated frequency of the occurrence, the severity of the likely consequences, and ability to detect the failure mode. Both the cam locking due to side loading of the energy absorber and the inability of the cam to engage the wire safety rope in a free-fall with the energy absorber in the raised position should have been considered and addressed by the manufacturer as part of the FMEA for the LAD-SAF X3 because the occurrences are foreseeable, likely to lead to severe consequences in terms of injury or death, and practically impossible to detect by the user beforehand.

Examination and laboratory testing show that at the time of design and manufacture of the LAD-SAF X3, safer alternative designs were available that improve operational reliability and significantly reduce the risk of injury by reducing the potential of impingement of the energy absorber on the cam. Potential impingement by adjacent components and resulting abnormal functionality is a well-recognized engineering problem.

Specific design modifications that reduce the potential for interference include incorporating a flange in the existing stepped shaft between the energy absorber and cam or reducing lateral motion of the energy absorber by reducing the clearance between the shaft and the bushings and/or replacing the polymeric bushings with either bronze bushings or bearings. Enhancing the ability of the cam to engage the wire safety rope due to inertial movement

would require modifying the gripping surface of the cam to enhance the engagement force at the point of initial contact with the wire safety rope.

The failure of the LAD-SAF X3 to reliably engage the wire safety rope in the expected, and therefore foreseeable, event of a fall renders the device defective and unreasonably dangerous. While testing of prototypes is required to fully validate design changes, it was technically and economically feasible at the time of design and manufacture of the LAD-SAF X3 to modify the design to make operation of the cam that is intended to engage the wire safety rope more reliable.

Summary of Opinions

Based on review of available information to date, we have reached the following conclusions to a reasonable degree of engineering certainty:

- 1) The June 8, 2017 fall incident was triggered by the failure of a welded polymer belt in the Ibex climb assist system.
- 2) The sudden failure of a welded region of the Ibex polymer belt resulted in a sudden transfer of more than 100 lbs. of weight that caused Mr. Moore to lose his grip on the ladder and begin to fall.
- 3) SafeWorks' failure to provide instructions and warnings to inspect belt welds prior to each climb rendered the Ibex climb support system defective and unreasonably dangerous. Providing such instructions was technically and economically feasible as demonstrated by SafeWorks' inclusion of such instructions and warnings in the Operator's Manual more than month after Mr. Moore's injuries occurred.
- 4) A malfunction in the LAD-SAF X3 cable clamp worn by Mr. Moore caused it to fail to engage the wire safety rope until Mr. Moore had fallen more than 20 feet.
- 5) DBI failed to consider operational conditions that could lead to severe injuries and that could have been reasonably anticipated during the design phase of the LAD-SAF X3 development.
- 6) The sudden deceleration caused by the belated deployment of the LAD-SAF X3 cable clamp generated high deceleration rates and associated high forces on Mr. Moore.
- 7) Even after the fall and partial deployment of the energy absorber, the subject LAD-SAF X3 cable clamp passed all user tests that are specified by DBI to be performed prior to a climb.
- 8) The LAD-SAF X3 is defectively designed in that it can fail to deploy properly under normal and expected conditions of use.
- 9) The defective design of the LAD-SAF X3 renders it unreasonably dangerous for its intended users.

10) Alternative and safer designs for the LAD-SAF X3 were technically and economically feasible.

The opinions and conclusions expressed in this report are based on the information available to Spectrum as of the date of this report. Review of documents is ongoing. As discovery continues, it may be that additional information will become available which will affect our opinions and conclusions and may require the preparation of an addendum report.

Respectfully submitted,



Bastiaan E. Cornelissen, Ph.D., P.E.



Respectfully submitted,



Mark D. Russell, Ph.D., P.E.



Resume of

Bastiaan E. Cornelissen, Ph.D., P.E.

Education: Ph.D. Materials Science & Metallurgical Engineering, Colorado School of Mines (2000); M.S Materials Science, University of California at Berkeley (1993), B.S. Metallurgical Engineering, South Dakota School of Mines (1987).

Registration: Dr. Cornelissen is a Registered Professional Engineer in Colorado, California, and Wyoming.

Experience: Principal, Spectrum Forensics LLC, 2015-Present
Principal, Forensic Consultants Group, 2011-2016
Principal, Event Analysis Group, 2008-2016
Senior Associate, Structural Integrity Associates, 2007-2013
Principal Engineer, Jacobson Forensic Engineering, 2000-2007
Senior Engineer, Ponderosa Associates, 2000
Senior Engineer, Knott Laboratory, 1993-2000
Research Associate, CO School of Mines, 1993-1999
Research Assistant, UC Berkeley, 1990-1993
Metallurgist, Anamet Laboratories, 1987-1990.

Forensic Engineering: Dr. Cornelissen has applied a multidisciplinary approach to the investigation of several hundred man/machine interactions and failures of engineered materials and devices. He has analyzed personal injury and property damage cases involving motor vehicles, conveyor systems, agricultural equipment, oil and gas wells, augers, overhead power lines, and automotive components. His expertise encompasses the analysis of failures in automotive, aerospace, utility, marine, electronics, medical, petroleum, and chemical processing industries. Representative cases involved failure analyses of pipelines, fasteners, medical devices, recreational equipment, heavy truck components, power lines, lifting cranes and oilfield equipment. He has applied his firearms experience and training as a firearms instructor to the analysis and reconstruction of firearms failures and shooting incidents.

Expert Testimony: As a result of his investigations, Dr. Cornelissen has provided expert testimony in court as well as during arbitration and mediation proceedings. He has testified on behalf of plaintiffs and defendants in cases involving materials engineering, medical devices, firearms, welding, fastening systems, and warnings and instructions.

Resume of

Bastiaan E. Cornelissen, Ph.D., P.E.**Publications:**

1. B.E. Cornelissen, R.H. Dauskardt, R.O. Ritchie, and G. Thomas, Cyclic Fatigue Behavior and Fracture Toughness of Silicon Nitride Ceramics Sintered with Rare- Earth Oxides, Acta Metall. & Mater. Vol. 42, No. 9, 1994.
2. B.E. Cornelissen, D.K. Matlock, G. Krauss, B. Gondesen, and F. T. Hoffmann, Bending Fatigue Performance of Gas- and Plasma-Carburized Steels, Society of Automotive Engineers (SAE) Paper 1999-01-0602, Detroit, Michigan, 1999.
3. D. J. Medlin, B. E. Cornelissen, D. K. Matlock, G. Krauss, and R. J. Filar, Effect of Thermal Treatments and Carbon Potentials on Bending Fatigue Performance of SAE 4320 Gear Steel, Society of Automotive Engineers (SAE) Paper 1999-01-0603, Detroit, Michigan, 1999.
4. B.E. Cornelissen, J. Kube, G. Marsh, and C. Finocchiaro, Evidence Handling and Preservation in Suspected Arson Cases, International Association of Arson Investigators, July 2001.
5. Bending Fatigue of Carburized Steels, Proc. 5th ASM Heat Treatment and Surface Engineering Conference in Europe, Gothenburg, Sweden, June 7-9, 2000
6. O. Jacobson, B. E. Cornelissen, G. Barbera, C. Thomas and D. Anderson, Motor Vehicle Event Data Recorders, Validation and Use of Data for Admission to the Court, Collision-The International Compendium for Crash Research, Vol. 1, Issue 1, 2006.
7. K. Pagel, B.E. Cornelissen, Applying Scientific Analysis Techniques to the Identification of Unknown Features of .50 BMG Caliber Ammunition, Very High Power Magazine, 2020-2.

Conferences/Seminars:

1. "Bending Fatigue Performance of Gas- and Plasma-Carburized Steels", Speaker, Society of Automotive Engineers Annual Convention, Detroit, Michigan, March 2, 1999.
2. "Alloying and Processing Approaches to Improved Bending Fatigue Performance of Carburized Gear Steels", Speaker, Advanced Steel Processing and Products Research Center's Twenty-Ninth Semiannual Technical Program, Colorado School of Mines, Golden, Colorado, September 13, 1999.
3. "Accident Reconstruction Using Conservation of Momentum & Energy", SAE, Troy, Michigan, August 27-28, 2001.
4. PC Crash Training Seminar, MacInnes Engineering, Las Vegas, Nevada, January 11-12, 2002.
5. Laser Survey Equipment Training, Laser Technology, Inc., Englewood, CO, April & July, 2002.
6. PC Crash Advanced Training Seminar, MacInnes Engineering, Las Vegas, Nevada, January 10-11, 2003
7. Motor Vehicle Accident Reconstruction Seminar - SAE 2004 World Congress, Detroit, Michigan, March 8-10, 2004.



8. Welding Training, Auburn Tools, April-May 2003.
9. 2003 International Whiplash Trauma Congress, Spinal Injury Foundation, Denver, Colorado, October 9-10, 2003.
10. 2004 ARC-CSI Crash Conference, Las Vegas, Nevada, June 21-23, 2004.
11. Commercial Vehicle Braking Systems Seminar, Troy, Michigan, August 2-4, 2006.
12. OSHA Health & Safety Training, South Jordan, Utah, February 25, 2008
13. Root Cause Analysis, Structural Integrity Associates, Centennial, Colorado, June 23, 2008
14. Forensic Engineering – The Role of the Engineer in the Legal System, Speaker, Colorado School of Mines, October 2008
15. Certified Fire & Explosion Investigator Seminar, NAFI, Boston, MA, March 8-11, 2010
16. Bolted Connections Course, ASME, Houston, TX, April 26-30, 2010
17. Effective Loss Scene Investigation, CLM, Omaha, NE, June 23, 2016
18. Modular Hip System Failure Analysis, ASM Rocky Mountain Chapter, October 4, 2018

Testimony:

Date	Client	Case #	Case Name	Location	Trial/Depo
02/20/15	Larson	2013CV14	Kelley v. Auk Enterprises et al	District Court, La Plata County, Colorado	Deposition
03/09/15	Kay	2013CV30983	Magna Energy Services v. Industrial Systems, Inc.	District Court, Weld County	Deposition
03/18/15	McLaughlin	BC475958	Warner v. Penenberg and Wright Medical Group	Superior Court, Los Angeles County, California	Deposition
03/26/15	Edwards	DV 09-145C	Chapman v. Harley-Davidson.	District Court, Gallatin County, Wyoming	Deposition
06/02/15	Cline	No. 45,927	Lexington v. Simkar	23rd Judicial District, Wharton County, Texas	Deposition
06/09/15	Martin	2014-69	Stevenson v. Lake	8th Judicial District, Platte County, Wyoming	Trial
07/07/15	Cline	No. 45,927	Lexington v. Simkar	23rd Judicial District, Wharton County, Texas	Deposition
08/14/15	Hedberg	161418610	American Wholesale v. AllState	Circuit Court, Lane County, Oregon	Trial
02/23/16	Bristol	2014CV030245	307Inc. v. Brewer Steel	District Court, Weld County	Deposition
03/29/16	McLaughlin	2:14-cv-08278 BRO-MRW	Sukonik v. Wright Medical	District Court, Central District of California, Western Division	Deposition

Testimony, cont.:

Date	Client	Case #	Case Name	Location	Trial/Depo
04/12/16	Bristol	2014CV030245	307Inc. v. Brewer Steel	District Court, Weld County	Trial
08/01/16	Killeen	1:15-cv-00909-MCA-KBM	Federal Insurance v. 3M	District Court, New Mexico	Deposition
08/03/16	Younger	13-CV-01899-PAB-GPG	Heinrich v. Jeg's Automotive	District Court, District of Colorado	Trial
09/20/16	Schafer	1:14-CV-00165	Robles v. Polar Corp	District Court, North Dakota	Deposition
10/12/16	McLaughlin	BC552067	Parks v. Wright Medical Technology	Superior Court, Los Angeles County, California	Deposition
12/13/16	Turner	3:14-cv-08115-NVW	TriState v. MHI	United States District Court, District of Arizona	Deposition
12/19/16	Miller	2015CV30977	Clymer v. Texas Farrier Supply	District Court, Boulder County, CO	Deposition
01/26/17	McLaughlin	CV2014-009277	Trittler v. Wright Medical Technology	Superior Court of Arizona Maricopa County	Deposition
03/13/17	Turner	3:14-cv-08115-NVW	TriState v. MHI	United States District Court, District of Arizona	Deposition
05/30/17	Breslau	1:15-cv-01252-RBJ	Wellons v. EVCE	United States District Court, District of Colorado	Trial
06/02/17	Fannin	2:15-cv-00294	Jardanowski v. Portland Orthopaedics	United States District Court, Eastern District of Wisconsin	Deposition
06/05/17	Sandefer	1:16-cv-00140-KHR	Case v. SM Energy	United States District Court, District of Wyoming	Deposition
06/08/17	Berg	16-cv-00009	Reynolds v. DoubleTap	United States District Court, District of Colorado	Deposition
07/18/17	Zukin	CV15-07102 CAS (KSx)	Biom/Sarafian v. Wright Medical Technology	United States District Court Central District of California	Deposition
08/09/17	MacArthur	16CV05612	National Surety Corporation v. United Heating & Cooling	District Court, Johnson County, KS	Deposition
08/11/17	Carafelli	DEN2017-01	Frontier Airlines v. City and County of Denver	CEO of Aviation, City and County of Denver	Hearing

Testimony, cont.:

Date	Client	Case #	Case Name	Location	Trial/Depo
08/15/17	McLaughlin	10-CI-656	Spencer v. Wright Medical Technology	Jefferson Circuit Court	Deposition
10/12/17	McLaughlin	1:16-cv-02105—msk-mjw	Wollam v. HowMedica	United States District Court, District of Colorado	Deposition
11/13/17	MacArthur	16CV05612	National Surety Corporation v. United Heating & Cooling	District Court, Johnson County, KS	Trial
1/11/18	Fourez	16SL-CC00962	Privilege v. D. Flynn Plumbing	Circuit Court – St. Louis County, MO	Deposition
1/25/18	McLaughlin	1:17-cv-10134	Feld v. Wright Medical Technology	United States District Court, District of Massachusetts	Deposition
2/7/18	Rardin	17CV00706	Pacific Indemnity v. Do-Right	District Court, Johnson County, KS	Deposition
4/20/18	Sitcoff	D01CI70002616	Newman v. Sapp Brothers	District Court, Douglas County, NE	Deposition
4/27/18	Breslau	15-cv-00091-ABJ	Sinclair WRC v. A&B Builders, LTD	District Court, District of Wyoming	Deposition
6/21/18	Breslau	15-cv-00091-ABJ	Sinclair WRC v. A&B Builders, LTD	District Court, District of Wyoming	Deposition
7/19/18	Pope	5:17cv062-KGB	Simpson v. Wright Medical Technology	District Court, Eastern District of Arkansas, Pine Bluff Division	Deposition
8/29/18	O'Connor	C15-02123	SLO District v. Teichert	Superior Court of California County of Contra Costa	Deposition
8/31/18	McLaughlin	1:16-cv-00456-CWD	Connell v. Lima	United States District Court, District of Idaho	Deposition
9/17/18	Killeen	1:17cv02196-KLM	Federal (Culp) v. Brasscraft	United States District Court, District of Colorado	Deposition
9/19/18	McLaughlin	1:17-cv-01601-CBS-WJM-SKC	Applekamp v. Wright Medical Technology	United States District Court, District of Colorado	Deposition
10/04/18	Dunford	2017-CV-001757-TO	Bankers v. OmegaFlex	District Court Sedgwick County, KS	Deposition

Testimony, cont.:

Date	Client	Case #	Case Name	Location	Trial/Depo
10/18/18	Wetli	17CR200003-4G	State of Colorado v. Kelley	District Court City and County of Denver	Trial
10/19/18	Wetli	17CR200003-4G	State of Colorado v. Kelley	District Court City and County of Denver	Trial
10/22/18	MacArthur	2017-CV-000966	Great Northern v. Ronnoco	District Court Wyandotte County, KS	Deposition
11/15/18	Dunford	36CIV16-23	Grove v. OmegaFlex	Circuit Court Jerauld County, SD	Deposition
12/05/18	O'Connor	C15-02123	SLO District v. Teichert	Superior Court of California County of Contra Costa	Deposition
12/10/18	Radley	2018CV030157	Herrera v. Summit Concrete	District Court Pueblo County, CO	Deposition
04/05/19	Lee	2016-CV-30128	Independence Pass v. Shaw Builders	District Court Pitkin County, CO	Deposition
04/09/19	Pope	1:16-CV-00108-RJS	Bradshaw v. WMT	District Court District of Utah	Deposition
04/23/19	MacArthur	2017-CV-30168	American Insurance v. BrassCraft	District Court Eagle County, CO	Deposition
05/02/19	Rossi	18-CV-01187-WYD-KLM	Ross v. UPRR	District Court District of Colorado	Deposition
6/6/19	McLaughlin	2:17-cv-00092-JNP	Burningham v. WMT	District Court District of Utah	Deposition
5/31/19	White	17CR8824	State of Colorado v. Howard Little	District Court City and County of Denver	Hearing
08/30/19	Zukin	2:17-cv-03178-CAS (KSx)	Bower v. WMT	District Court Central District of California	Deposition
08/30/19	Zukin	2:17-cv-03196-CAS (KSx)	Prater v. WMT	District Court Central District of California	Deposition
10/22/19	Leemon	1:18-cv-01813-RM-MEH	McCauley v. Howmedica	District Court District of Colorado	Deposition
1/27/20	Wiens	CV-2018-0615	Basic Energy v. Thunder Basin	Eighth Judicial District Niobrara, WY	Deposition
4/6/20	Sutton	1:18-cv-03063-WJM-STV	Macias v. Skyjack	District Court District of Colorado	Deposition
4/25/20	Dunford	1:19-cv-01658-SKC	Zavanna v. Warren Alloy	District Court District of Colorado	Deposition



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 Englewood, CO 80110
 303.963.9650
 spectrumllc-co.com

Testimony, cont.:

Date	Client	Case #	Case Name	Location	Trial/Depo
4/28/20	Sutton	1:18-cv-03063-WJM-STV	Macias v. Skyjack	District Court District of Colorado	Deposition
6/19/20	Rardin	1:19-cv-02350-KLM	Bankers v. BrassCraft	District Court District of Colorado	Deposition
8/29/20	Hansen	4:15-cv-00072-DN-PK	Mickelsen v. Aramark	District Court District of Utah	Deposition
10/1/20	Vollbrecht	27-cv-17-16231	United Healthcare v. Fremont	District Court – State of MN Hennepin County – 4 th Judicial District	Deposition

MARK D. RUSSELL, Ph.D., P.E., CFEI

Denver, Colorado 80210

Telephone: (303) 475-9557

mdr@spectrullc-co.com

EDUCATION:

1993	Ph.D., Mechanical Engineering University of Missouri, Columbia, Missouri
1989	M.S., Nuclear Engineering University of Missouri, Columbia, Missouri
1987	B.S., Mechanical Engineering University of Missouri, Columbia, Missouri

EXPERIENCE:

April 2020 to Present	Spectrum Forensics LLC Englewood, CO
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Principal Engineer. Comprehensive forensic engineering services including investigation and analysis of the cause of failure, cost and scope of damage associated with failure, and expert witness testimony. Specialized consulting in the areas of mechanical systems, manufacturing processes, and complex systems. Fire and explosion investigations. Analysis and modeling of complex phenomena.

July 2019 to April 2020	Paladin Consulting Solutions LLC Denver, CO
----------------------------	--

Founder and Principal. Comprehensive forensic engineering services including investigation and analysis of the cause of failure, cost and scope of damage associated with failure, and expert witness testimony. Specialized consulting in the areas of mechanical systems, manufacturing processes, and complex systems. Fire and explosion investigations. Analysis and modeling of complex phenomena. Provide training to forensic consultants in the practice of forensic engineering, cause determination, and report writing.

July 2011 to June 2019	Engineering Design & Testing Corp. Columbia, SC
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Chief Engineer (January 2014 – June 2019), Associate Chief Engineer (July 2013 – December 2013), Consulting Engineer (July 2011 – July 2013). Specialized consulting in the areas of mechanical systems, manufacturing processes, conveyor systems, acoustical and vibration analysis of machinery. Fire and explosion investigations. Root cause investigation and analysis of mechanical damage to equipment,

components, and materials, including fracture analysis and failure analysis. Preparation of repair and replace cost estimates. Investigation of incidents involving residential, industrial and commercial systems. Damage evaluation and assessment.

May 2009
to July 2011

Elegant Consulting Solutions
Goodlettsville, Tennessee

Principal and Founder. Projects included design evaluation of and improvement recommendations for an oil well drill bit, evaluation of the feasibility of using various sources of biomass as a feedstock for the production of biodiesel, life cycle analysis of various energy technologies for potential investment and development, evaluation of custom simulation software package for use in the development of continuously variable transmissions.

June 2005
to March 2009

Span Tech LLC,
Glasgow, Kentucky

Vice President of Research and Development. Managed research and development engineers responsible for new product designs, custom design software development, and new product launch. Researched new technologies for patent applications. Researched the source of a long-standing in-service problem with conveyor cleanliness, and was sole inventor of the technology that eliminated this problem (developed the process, specified the required equipment, and supervised the installation of the required equipment).

May 2003
to May 2005

Trace Die Cast
Bowling Green, Kentucky

Manufacturing Engineer. Provided production support through process evaluation and improvements for aluminum die-cast production, including quality assessment of parts, root cause analysis of defects, and process change implementation to correct for defects.

Quality Manager. Root cause analysis of various part defects and process improvements and design changes implementation to address these defects.

Program Manager. Resolution of product-quality discrepancies, including root cause analysis of defective parts found at customer sites, corrective action implementation and documentation, and reporting. New product launch management.

February 2000
to May 2003

Leggett and Platt Aluminum Group
Monroe City, Missouri

October 2020

Quality Engineer/Quality Manager. Quality management for a range of die-cast aluminum products. Developed a die-cast process auditing system to improve conformance to established process parameters.

February 1999
to November 1999

**Russell Brothers Construction Company
Columbia, Missouri**

Founder and Co-owner. Managed budgets for construction projects. Supervised construction activities, including coordination of work by subcontractors. Secured investment and financing for initial construction project.

August 1994
to February 1999

**University of Missouri
Columbia, Missouri**

Research Assistant Professor/Senior Research Specialist

Department of Mechanical and Aerospace Engineering - Conducted research on the ultrasonic nondestructive evaluation of polycrystalline materials; results of research are applicable to any wave scattering medium including atmospheric formations, geologic structures, and the human body.

Department of Biological and Agricultural Engineering - Conducted research to improve the detection and characterization of prostate cancer via medical ultrasound. Conducted water quality research related to agricultural applications. Taught introductory physics course for undergraduate students.

Department of Biological and Agricultural Engineering - Conducted research on fueling diesel engines with biodiesel. Investigated the impact of biodiesel on the emissions, maintenance, durability, and power performance of diesel engines.

June 1993
to May 1994

**University of Missouri Hospital and Clinics
Columbia, Missouri**

Post-Doctoral Fellow, Department of Radiology. Conducted research on the ultrasonic acoustic properties of healthy and cancerous prostate tissue. Investigated correlation between the ultrasonic acoustic parameters and the histopathology of the cancerous prostate.

CONTINUING EDUCATION:

Die Cast Die Design, Bueller AG, Wil Switzerland, 2003

Die Casting Process Optimization, Bueler AG, Wil Switzerland, 2003

World Tribology Congress III, ASME, Washington, D.C., 2005

Leadership Training Conference, ASME, Dallas, TX, 2010

Leadership Training Conference (Advanced), ASME, Dallas, TX, 2011

ASME District F Sections Seminar, Atlanta, GA, 2011

Full Field Deformation and Strain Measurement, ASME, Atlanta, GA, 2011

A Brief History of Aircraft Engine Development at General Electric, ASME, Atlanta, GA, 2011

Rotating Equipment and Predictive Maintenance, Engineering Design & Testing, Columbia, SC, 2011

Confined Space Entry, South Carolina Chapter National Safety Council (On-Line), 2011

Principles of Failure Analysis, ASM International (On-Line), 2011

Analysis of Plastic Fractures, Engineering Design & Testing, Orlando, FL, 2012

Losses in Renewable and Alternative Energy, Engineering Design & Testing, Orlando, FL, 2012

The Daubert Decision: Where Have We Come Since 1993? (Presenter), Engineering Design & Testing, Orlando, FL, 2012

Ethical Challenges for the ED&T Engineer, Engineering Design & Testing, Orlando, FL, 2012

Quantitative Measurement of LP/Natural Gas Pipe Systems, Engineering Design & Testing, Orlando, FL, 2012

Hot Wheels: Investigating Vehicle Fires, Engineering Design & Testing, Orlando, FL 2012

Advanced Fire, Arson & Explosion Investigation Training Program, National Association of Fire Investigators, Sarasota, FL, 2012

Social Networking and the Consulting Engineer, Engineering Design & Testing, Columbia, SC, 2013

Filing Rules in a Judicial System, Engineering Design & Testing, Columbia, SC, 2013

Salt Spreader Session, Engineering Design & Testing, Columbia, SC, 2013

Fire Session Panel, Engineering Design & Testing, Columbia, SC, 2013

Shaking Things Up a Bit – A Summary of Lessons Learned in the Field of Vibration, Engineering Design & Testing, Salt Lake City, UT, 2014

Products Liability and the Engineer – What Does It Mean to be Strictly Liable, Engineering Design & Testing, Salt Lake City, UT, 2014

Presentation of Credentials in Litigation, Engineering Design & Testing, Salt Lake City, UT, 2014

The Construction Sit and Conflict – Standard of Care, Engineering Design & Testing, Salt Lake City, UT, 2014

Material Science & Technologies Conference, Pittsburgh, PA, 2014

Ways to Increase and Retain Clients, Engineering Design & Testing, Nashville, TN, 2015

Modern Data Management for Engineering Investigations – Acquisition, Storage and Access, Engineering Design & Testing, Nashville, TN, 2015

Federal Rules of Civil Procedure (FRCP) Rule 26 – Expert Reports, Engineering Design & Testing, Nashville, TN, 2015

What to do when you get it WRONG, Engineering Design & Testing, Nashville, TN, 2015

Florida Laws & Rules Online, SunCam, 2015

Material Science & Technologies Conference, Columbus, OH, 2015

Geardrive Fundamentals and Failure Analysis, Engineering Design & Testing, Columbia, SC, 2016

Panel Discussion – Revised NFPA 1033, Engineering Design & Testing, Columbia, SC, 2016

Introduction to Aircraft Systems, Practical Aeronautics, Inc., 2016

Ballast Water Management, Engineering Design & Testing, Columbia, SC, 2016

Variable Frequency Drives, Engineering Design & Testing, Columbia, SC, 2016

Case Studies in Engineering Ethics, Engineering Design & Testing, Albuquerque, NM, 2017

Ballast Water Management: Background, Practice and Legislation, Engineering Design & Testing, Albuquerque, NM, 2017

NFPA 1033 – Questions and Terms to Expect in Testimony, Engineering Design & Testing, Albuquerque, NM, 2017

PUBLICATIONS:

Russell, M. D., S. P. Neal, and E. J. Boote. Experimental estimation of the longitudinal-wave backscatter coefficients for ultrasonic interrogation of weak scattering materials. *J. Acoust. Soc. Am.* 93 (3), 1267-1276 (1993).

Russell, M. D., and S. P. Neal. Experimental estimation of the transverse-wave backscatter coefficients for ultrasonic interrogation of weak scattering materials. *J. Acoust. Soc. Am.* 94 (4), 2413-2419 (1993).

Boote, E. J., L. J. Anglo, S. P. Neal, H. Sun, M. D. Russell, and T. S. Loy. *In Vitro* measurement of prostate acoustic properties. *Radiology* 189(P) (1993).

Russell, M. D., and S. P. Neal. Grain noise power spectrum estimation for weak scattering polycrystalline materials using experimentally estimated backscatter coefficients: normal incidence. *Ultrasonics* 32(3), 163-171 (1994).

Russell, M. D., and S. P. Neal. Grain noise power spectrum estimation for weak scattering polycrystalline materials using experimentally estimated backscatter coefficients: oblique incidence. *Ultrasonics* 32(3), 173-180 (1994).

Russell, M. D. Telescope performance on the planets. *Sky & Telescope*, March 1995, pp. 90-93.

Russell, M. D., H. Sun, M. L. Wicks, B. L. Kincaid, S. P. Neal, E. J. Boote, R. J. Churchill, L. J. Anglo, W. R. Holloway, G. Ross, and T. S. Loy. Ultrasonic Nondestructive Evaluation Applied to Prostate Cancer Detection. *Nondestructive Testing and Evaluation*. Vol 14, 237-256 (1998).

Russell, M. D., and S. P. Neal. 1992. A model-based approach to acoustic noise power spectrum estimation for normal incidence testing. *Review of Progress in Quantitative Nondestructive Evaluation*, edited by D.O. Thompson and D.E. Chimenti (Plenum, New York, 1992), Vol. 11B, pp. 2283-2290.

Russell, M. D., and S. P. Neal. 1992. Acoustic noise power spectrum estimation for normal incidence ultrasonic testing using experimentally determined backscatter coefficient estimates. *American Society for Nondestructive Testing 1992 Fall Conference proceedings*.

Russell, M. D., and S. P. Neal. 1994. Backscatter Coefficient estimation and grain noise power spectrum modeling for weak scattering polycrystalline materials with depth and angle independent scattering. *Review of Progress in Quantitative Nondestructive Evaluation*, edited by D.O. Thompson and D.E. Chimenti (Plenum, New York, 1994), Vol. 13B, pp. 1705-1712.

Schumacher, L. G., M. D. Russell, S. A. Howell. 1995. Lubricity of Biodiesel/Petroleum Diesel Blends. *ASAE Regional Meeting*. April 7-8, 1995. St. Joseph, MO.

Schumacher, L. G., M. D. Russell, J. A. Weber, J. G. Krah. 1995. Maintenance, Repair, Engine Exhaust Emissions Associated with Biodiesel Fueling of Urban Buses. *ASAE Annual International Meeting*. June 18-23, 1995. Chicago, IL.

Schumacher, L. G., S. C. Borgelt, and M. D. Russell. 1995. Fueling 5.9L and 7.3 L Navistar Engines with Biodiesel-20. ASAE Annual International Meeting. June 18-23, 1995. Chicago, IL.

Schumacher, L. G., S. C. Borgelt, M. D. Russell, and W. G. Hires. 1995. Project Update: Fueling 5.9L Cummins Engines with 100% Biodiesel. ASAE Annual International Meeting. June 18-23, 1995. Chicago, IL.

Russell, M. D., and S. P. Neal. 1997. Experimental evidence of single and multiple scattering in polycrystalline materials, *Review of Progress in Quantitative Nondestructive Evaluation*, edited by D.O. Thompson and D.E. Chimenti (Plenum, New York, 1997), Vol. 16

Russell, M. D., H. Sun, B. L. Kincaid, M. L. Wicks, S. P. Neal, E. J. Boote, R. J. Churchill, L. J. Anglo, W. R. Holloway, G. Ross, T. S. Loy. 1997. In-vitro correlation of acoustic parameters with tissue histopathology for cancer detection in the human prostate, *Review of Progress in Quantitative Nondestructive Evaluation*, edited by D.O. Thompson and D.E. Chimenti (Plenum, New York, 1997), Vol. 16

Wicks, M. L., H. Sun, M. D. Russell, S. P. Neal, E. J. Boote, L. J. Anglo, G. Ross, T. S. Loy. In vitro correlation of echogenicity and differential echogenicity with human prostate cancer grade. In 1997 IEEE Ultrasonics Symposium Proceedings. IEEE, New York, 2:1127, 1997.

Russell, M.D., and Jur, T.A. Engineering Analysis of Failure: A Determination of Cause Method, *Journal of Failure Analysis and Prevention*, 17(1), 8-14

PRESENTATIONS:

Review of Progress in Quantitative Nondestructive Evaluation, Brunswick, ME, 1991

American Society for Nondestructive Testing, 1992 Fall Conference, Chicago, IL

American Society for Nondestructive Testing, 1993 Spring Conference, Nashville, TN

Review of Progress in Quantitative Nondestructive Evaluation, Brunswick, ME, 1993

Astronomical League National Convention, Kansas City, MO, 1994

Workshop on Diesel Engine Warranty Issues, Moscow, ID, 1994

Consortium for Plant Biotechnology Research, Chicago, IL, 1995

Missouri Soybean Merchandising Council Meeting, Lake of the Ozarks, MO, 1995

Review of Progress in Quantitative Nondestructive Evaluation, Brunswick, ME, 1996

ASME Nashville Section, Nashville, TN, 2011

ASME Colorado Section, Denver, CO, 2011

MS&T Conference, Pittsburgh, PA, 2014

MS&T Conference, Columbus, OH, 2015

Engineering Analysis of Failure: Determination of Cause in a Legal Environment, Albuquerque, NM, 2017

National Association of Subrogation Professionals, Austin, TX, 2017

Colorado Defense Lawyers Association, Telluride, CO, 2018

MS&T Conference, Portland, OR, 2019

PATENTS:

Russell, M. D. United States Patent: 7,837,029. WEAR-RESISTANT CONNECTOR FOR A MODULAR LINK CONVEYOR BELT. Issued November 23, 2010.

Layne, J. L., Ward, L. W., Thomas, B. K., and Russell, M. D. United States Patent: 7,841,462 B2. SIDE-FLEXING CONVEYOR CHAIN WITH PIVOTING SLATS AND RELATED METHODS. Issued November 30, 2010.

PROFESSIONAL ORGANIZATIONS:

American Society of Mechanical Engineers (ASME) - Former chair of Nashville Section

ASM International/Failure Analysis Society

ASTM International

National Association of Subrogation Professionals (NASP)

National Association of Fire Investigators (NAFI)

National Fire Protection Association (NFPA)

REGISTRATIONS and CERTIFICATIONS:

Registered Professional Engineer in Alabama (31898-E)

Registered Professional Engineer in Arizona (53236)

Registered Professional Engineer in California (M37448)

Registered Professional Engineer in Colorado (45660)

Registered Professional Engineer in Florida (76716)

Registered Professional Engineer in Georgia (PE041631)

Registered Professional Engineer in Iowa (21339)

Registered Professional Engineer in Kansas (21886)

Registered Professional Engineer in Massachusetts (52048)

Registered Professional Engineer in Michigan (6201060657)

Registered Professional Engineer in Missouri (2001004657)

Registered Professional Engineer in Montana (PEL-PE-LIC-21150)

Registered Professional Engineer in Nebraska (E-13876)
 Registered Professional Engineer in New Mexico (21453)
 Registered Professional Engineer in North Carolina (040585)
 Registered Professional Engineer in North Dakota (PE-8341)
 Registered Professional Engineer in Oklahoma (PE 27086)
 Registered Professional Engineer in South Carolina (30838)
 Registered Professional Engineer in Tennessee (113163)
 Registered Professional Engineer in Utah (8477041-2202)
 Registered Professional Engineer in Virginia (0402054062)
 Registered Professional Engineer in Washington (52496)
 Registered Professional Engineer in Wyoming (PE13254)
 National Council of Examiners for Engineering and Surveying Record (46428)
 NCEES International Registry
 Private Pilot - Airplane Single-Engine Land; Instrument (3125151)
 Certified Fire and Explosion Investigator CFEI

TESTIMONY HISTORY:

Date	Case Number	Venue	Participation	Description
June 1999 (approx.)	1399CC080861	Circuit Court of Boone County Missouri	Deposition	Participated as party in lawsuit
September 29, 2000	1399CC080861	Circuit Court of Boone County Missouri	Testimony	Participated as party in lawsuit
May 9, 2013	3:11-cv-13	District Court for the Southern District of Iowa	Deposition	Expert witness
November 18, 2014	CJ-2013-132	District Court for Ottawa County State of Oklahoma	Deposition	Expert witness

October 2020

PROFESSIONAL RATES^{1,2}

Bastiaan E. Cornelissen, Ph.D., P.E.:	\$385/hour
Carl V. Finocchiaro, M.S., P.E., CFI:	\$310/hour
Mark. D. Russell, Ph.D., P.E., CFEI:	\$310/hour
Brian D. Beatty, M.S., RE/CM:	\$275/hours
R. Kim Bezzant:	\$305/hour

OTHER FEES

Scanning Electron Microscope:	\$305/hour
Keyence Digital Microscope:	\$165/hour
Laboratory Facility Charge:	\$550/half day
Thermal Imaging Camera:	\$150/day
Combustion Analyzer:	\$100/day
Metallurgical Laboratory:	\$100/hour
Mileage:	Current IRS Standard Mileage Rate
Photographs:	\$1/image
Expenses:	Cost + 10%
Project Administration: ³	5.0%

¹ Invoices are due 30 days after receipt. Late charges apply to invoices that remain unpaid after 30 days.

² Deposition and trial requests are not considered confirmed until a deposit equal to 4 hours of deposition or trial time has been received (in-state). Deposits are equal to 8 hours of deposition time or trial time and estimated travel costs if scheduled out of state. Deposits are refundable if deposition or trial appearance is cancelled more than one week in advance.

³ Project administration charges are applied to professional fees only.



**LITIGATION
SUPPORT**
A DSC Company
**J. Nigel Ellis, Ph.D., P.E., CSP,
CPE**

**306 Country Club Drive
Wilmington, DE 19803-2920**

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Fax: (302) 571-0756

Website: www.FallSafety.com

Email: dsc@FallSafety.com

**Recipient of the National Safety Council's
Distinguished Service to Safety Award**

**Named a Top 50 Most Influential EHS Leader by Occupational Hazards Magazine
ASSE Fellow Honor Award #109 in 2010; ASSE Bresnahan Standards Medal 2011**

Kyle Long, Esq.
The Robert Pahlke Law Group
2425 Circle Drive, Suite 200
Scottsbluff, NE 69361

14th October 2020

Re: J. Nigel Ellis Preliminary Report on the Justin Moore case

Dear Mr. Long:

You have requested that I review various materials, conduct research and express my professional opinions relating to the injurious fall of Invenergy employee, Justin Moore on June 8, 2017.

I have been an expert in fall protection since the mid-1970's and am familiar with tower fixed ladders and their safety devices. I am also familiar with the fall hazards in these environments and the requirements of OSHA and ANSI for fall hazard climbing protection as well as the continuing development of these national standards. I am well-qualified to discuss these issues based on my extensive education, training and experience and authorship of numerous publications in the field of fall protection and associated technologies. My CV is attached and marked Exhibit A.

The purpose of my preliminary review and evaluation in this matter is to help determine whether and to what extent the defendants DB Industries, SafeWorks or others acted in a negligent manner and the contribution of their conduct, if any, to Justin Moore's fall. To that end, I have reviewed the following materials relative to the facts and circumstances underlying Mr. Moore's fall:

Justin Moore deposition 9/24/2020
Corey Wade Statement
Kolton Irby Statement
Power Climber Wind IBEX 1000 Operators Manual Climb Assist System
01/01/17-06/09/17 Climb Report
Inspection Notice
IBEX Power Climber Marketing Material
Invenergy Corporate Safety Alert
Investigation Report by Invenergy
2019.04.25 Power Climber Wind Alert to the Wind Industry
2019.04.25 3M Alert to the Wind Energy Industry
Exemplar Lad-Saf X3
Documents for DB Industries Responses to Request for Production



A DSC Company
J. Nigel Ellis, Ph.D., P.E., CSP,
CPE

306 Country Club Drive
Wilmington, DE 19803-2920

Phone: (302) 571-8470

Fax: (302) 571-0756

Website: www.FallSafety.com

Email: dsc@FallSafety.com

Recipient of the National Safety Council's
Distinguished Service to Safety Award

Named a Top 50 Most Influential EHS Leader by Occupational Hazards Magazine
ASSE Fellow Honor Award #109 in 2010; ASSE Bresnahan Standards Medal 2011

Lad-Saf FMEA Spreadsheet

2016 3M DBI SALA Lad-Saf User Instructions (Flexible Cable Ladder Safety System)

Documents for SafeWorks Responses to Request for Production (including Natives)

ESi Inspection Lab Data Package

Site Inspections dated 08/19/2020 and 10/6-7/2020

Photographs

Amended Complaint of 6/13/19

Patent US 9,636,528 B2

SafeWorks and DB Industries test data

Summary of Facts:

1. On 8 June 2017, Mr. Moore was working as a Wind Technician for Invenergy. He was elevated near 300 ft. inside Wind Tower #41 Goldthwaite Texas when he fell part way down the tower.
2. At the time, he was wearing a DBI ExoFit full body harness which was attached to an IBEX Climbing Assist System and also a DBI Lad-Saf X3 Climbing Protection System in case of IBEX cable failure. He also had two shock absorbing lanyards (Y-lanyards) available to him to provide fall protection during work performed on tower equipment.
3. The IBEX cable system is a polyester core endless cable driven by a motor controlled by a up/down/STOP radio switch held onto the IBEX cable with a Petzl rope grab. There are several settings to provide lift power to assist the climber and reduce climbing fatigue.
4. He was descending and believed he had closed the floor plate of the Yaw deck when suddenly there was "a violent movement".
5. He fell approximately 20 ft until the Lad-Saf finally arrested him. Mr. Moore reports being disoriented after the fall.
6. The free fall was stopped when the fall arrestor engaged. Due to the force of the fall the Lad-Saf metal energy absorber was activated. However, the force of the fall is reported to have resulted in injury to his upper body.
7. The tower #41 had a 20 ft climb section with one CLFAS to reach the base of the tower where 217 ft of CLFAS was installed along with the IBEX system were both attached to the climber's harness at his chest D-ring.
8. Two laboratory inspections were performed of the fall protection components at ESi in Dallas, TX. A site inspection was performed of tower #41 at Invenergy's facility in Goldthwaite, TX. No access to view the upper cable attachments to the ladder was permitted by Invenergy for the experts who visited tower #41 on 10-6-20 for inspection where the fall occurred.



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Recipient of the National Safety Council's
Distinguished Service to Safety Award

Named a Top 50 Most Influential EHS Leader by Occupational Hazards Magazine
ASSE Fellow Honor Award #109 in 2010; ASSE Bresnahan Standards Medal 2011

The Hazard – background:

1. Climbing and working at height in a wind turbine creates a hazard of falling from ladders and through open hatches. In Mr. Moore's case, he used the assist device as well as the attached the fall arrest system correctly to protect himself from an approximately 200 ft fall hazard. .
2. The fall protection industry as shown by the promulgation of ANSI Z359.16 recognizes that a fall arrestor, such as the Lad-Saf must be able to activate and stop a fall regardless of the user's hand position on the device. The well-known practice by users of adjusting the Lad Saf and holding open the Lad-Saf locking lever in order to facilitate descent resulted in reliance on an inertia back-up lock to arrest a fall. Additionally, it was known in the industry that a user could unintentionally grab the Lad-Saf as a fall is initiating and hold the device locking lever open in what is referred to as a "panic grab" with inability to let go.
3. The failure of the Lad-Saf device locking lever to lock resulted in an approximate 20 ft. free fall. The most likely cause of the locking lever's failure was because the lever was held in the upright position while descending or preparing to descend which could not be released during the fall.
4. The unexpected failure of the back-up inertia locking system resulted in Mr. Moore's injury. From testing it was discovered the grabbing of the device and locking lever could deactivate the inertia locking system if a later load was exerted on the locking lever. This was the most likely cause of the inertia locking systems failure.

The Hazard – found here – Note: Regulations and standards quoted in this report are used as standards of care and from the bodies of knowledge in the field of fall protection.

1. The DBI Lad-Saf X3 model 6160054 serial 0005580 was unreliable, producing variable results when attempting to lock the inertia second lock while holding the device with the locking lever disabled by the user. This resulted in an uncontrolled disastrous free fall for Mr. Moore.

NOTE: The practice of holding open the locking lever while climbing is well known by experience and expectation of the user which should have been known by a reasonable supplier. The practice of temporarily disabling the lock lever while climbing to facilitate vertical movement is not only foreseeable but is entirely reasonable under field conditions. Unfortunately, during a sudden unexpected fall, the user often continues to hold the device open in what is referred to as a "panic grab" with inability to let go under emergency conditions allowing the climber to free fall.



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Hazard Controls: Testing the two locks until no free-fall failures are experienced is critical to achieving acceptable reliance both together and separately in the design and development phase of this fall protection system.

1. The testing should be by both manual means and also with test weights according to ANSI Z359.16 standard Safety Requirements for Climbing Ladder Fall Arrest Systems (CLFAS) requirements (282 lbs). When the system was tested manually in the ESI lab by the author and others using the original device as well as exemplars, they both failed to function as expected and required by the above standards. Specifically, the test requirement was not met manually with the inertia lock by the experts on 10-6-20 at the offices of ESI in Dallas, TX.
2. 3M and SafeWorks should have followed the following ANSI standards until satisfied with the test result: Z359.16 (Exhibit B), including Section 3.2.5
3. The federal standards for Ladder Safety Devices stated at 29CFR1910.29(i)(6) require a drop test of 500 lbs through 18" with the inertia lock alone.
4. The ANSI Fixed Ladder standard drop test A14.3-2008 of 500 lbs dropped through 18" was also apparently not met with the inertia lock function and not reported.

Preliminary Opinions:

1. DB Industries claims and states that the Lad Saf X3 complied with performance standards set forth by ANSI. Z359.16 required that the device must not drop more than 20" before locking. On 8 June 2017, the Lad Saf X3 used by Mr. Moore failed to meet performance standards as Mr. Moore's fall distance greatly exceeded the 20" standard.
2. DB Industries failed to adequately design and test the Lad-Saf X3 cable grab under foreseeable usage conditions in accordance with the Z359.16 test procedure. Although defendants conducted performance testing of the product over a period of years, the deficiencies in the system were never successfully addressed while they continued to market the product. When the Lad Saf X3 was brought to market DB Industries was aware of SafeWorks's IBEX Climb Assist and was aware that IBEX represented the leading climb assist system utilized in the wind industry. Despite this awareness DB Industries brought the Lad Saf X3 to market without any compatibility testing. Fall protection industry standards require a manufacturer such as DB Industries to consider the use of its product with the Ibex climb assist in such a situation, and further require testing of the products together. The failure of testing by DB Industries rendered the device unreasonably dangerous for its intended use when it was manufactured and sold.
3. There was a failure by DB Industries to adequately train, instruct and warn users on the usage of the DBI systems and specifically to warn of the deficiencies/limitations of the system. DB Industries failed to warn users on the potential incompatibility of the Lad Saf X3



**LITIGATION
SUPPORT**
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ASSE Fellow Honor Award #109 in 2010; ASSE Bresnahan Standards Medal 2011**

with climb assist systems when it manufactured and sold Mr. Moore's Lad Saf X3 in 2016. This is evident from the testing and training reports provided in discovery and made available for review. Furthermore, DB Industries failed to warn that its second inertia lock could fail if the locking lever was grabbed, as a user may reasonably do in the process of climbing, or by the unintentional reflexive grabbing that a user may foreseeably do during a fall. The DB Industries failure to train, instruct and warn users rendered the device unreasonably dangerous for its intended use when it was manufactured and sold.

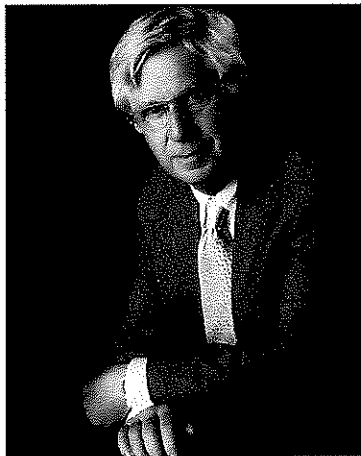
4. There was a failure by SafeWorks to provide adequate instructions and warnings to users of the system regarding its limitations/deficiencies and specifically on the failures from broken polyester cables. Safeworks failed to warn about the risk of the cable separating under load due to a weld failure. SafeWorks internal pre-market testing showed that the cable was expected to fail by core separation which would result in the cable stretching, but not separating. SafeWorks internal capability testing validated this failure mode and that the cable did not fail at a weld. Beginning in 2013, Safeworks began receiving user complaints of cables experiencing weld failures. In August of 2016, SafeWorks received notice of cable separations due to weld failure and its investigations concluded that the cables separated because of inadequate welds. When SafeWorks learned of cable separations caused by inadequate welds, it should have issued a notice of inspection to all of its users directing them to perform regular daily inspections of the welds looking for signs of failure.. This is based on records supplied by SafeWorks showing evidence of complaints/failures with little or no notice to buyers while bulk sales of the product continued. Specifically, the literature that accompanied the product was misleading in that it minimized the problems with the system while emphasizing the safety and ease of use.
5. There was a failure by both defendants to comply with the "best practices" of Appendix A of ANSI Z359.16-2016 which calls attention to the need for a fall protection system and climbing assist system to be compatible when used together. There is no evidence in the materials reviewed that any effort was made by defendants to collaborate in order to meet this compatibility standard before Mr. Moore's fall.¹

I reserve the right to amend and extend this report as further discovery becomes available.

J. Nigel Ellis, Ph.D., CSP, P.E., CPE
President

¹ It is a matter of public record, and my own personal knowledge, that DB Industries was instrumental in developing this standard.

EXHIBIT A



C.V.

J. NIGEL ELLIS, Ph.D., CSP, P.E., CPE

www.FallSafety.com/expert Fall Safety Litigation Support

www.FallSafe.com Fall Protection Engineering

www.PFAT.net FallProtectionEngineering.com

DSC Companies:

**Ellis Fall Safety Solutions. LLC
Ellis Litigation Support (dba DSC
Ellis Ladder Improvements, Inc.**

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Dr. J. Nigel Ellis, CSP, P.E., CPE

Dr. J. Nigel Ellis is a leading authority in the field of industrial and construction fall protection. He is President of DYNAMIC SCIENTIFIC CONTROLS (DSC), Divisions of DSC include: Ellis Fall Safety Solutions, a consulting firm specializing in fall hazard control planning, engineering and training. Ellis Litigation Support and Ellis Ladder Improvements (ELI).

He is former Chief Executive Officer of RESEARCH & TRADING CORPORATION (RTC) of Wilmington, Delaware producers of an extensive line of industrial fall protection, controlled descent and confined entry rescue systems.

A Board Certified Safety Professional (CSP) by examination 1984, Dr. Ellis is the 109th Fellow and Professional Member of the American Society of Safety Engineers (ASSE) with memberships in the Construction and Consultant Divisions. In 2011 was awarded the ASSE Thomas F. Bresnahan Standards Medal for voluntary standards Excellence participation. He is also a Distinguished Service to Safety Award winner in 2007 and in 2018 he received the NSC Honorary Lifetime Achievement Award and member of the National Safety Council (NSC) and is Past Chairman of the NSC Construction Division. In addition, a member of the Human Factors & Ergonomics Society and Past President of the Veterans of Safety (VOS), Past Dean of Ambassadors (VOS), www.vetsofsafety.org

Dr. Ellis is a Registered Professional Safety Engineer in the States of California and Massachusetts. He is a Board Certified Professional Ergonomist (CPE) 1994,(human factors specialist) and he is also a National Academy of Forensic Engineers (NAFE), CESB Board Certified Fellow in Forensic Engineering. (Council of Engineering Specialty Boards).

Over three decades, Dr. Ellis has helped develop Occupational Safety & Health Administration (OSHA) standards on fall protection, emergency egress and confined space safety. He has testified at OSHA hearings on fall protection in the Oil and Gas Well Drilling and Servicing industry, Exterior Building Maintenance, Construction, General Industry and Confined Space Standards. He provides expert witness services to OSHA in fall protection cases and also testifies in negligence and product liability cases

Dr. Ellis has been a member of the following ANSI, ASME, ASTM, SAE, and ISO committees and groups for many years:

- | | |
|--------|---|
| Z359.1 | Personal Fall Protection (General Industry) and several sub-committees including the following: |
| Z359.2 | Minimum Requirements for a Comprehensive Managed Fall Protection Program |
| Z359.3 | Safety Requirements for Positioning and Travel Restraint Systems (Former Chairman) |

Z359.6	Specifications and Design requirements for Active Fall Protection Systems
Z359.8	Requirements for Rope Access
Z359.9	Personal Equipment for Protection Against Falls-Descending
Z359.12	Connecting Components for Personal Fall Arrest Systems
Z359.14	Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and rescue Systems
Z359.15	Safety Requirements for Vertical Lifelines for Personal Fall Arrest Systems
Z359.16	Safety Requirements for Fall Arresters for Personal Fall Arrest Systems
Z359.17	Safety Requirements for Horizontal Lifelines for Personal Fall Arrest Systems
Z359.18	Safety Requirements for Anchorage Connectors for Personal Fall Arrest Systems
A10	Construction & Demolition Operations Committee and several sub-committees including:
A10.08	Scaffolding Safety Requirements
A10.18	Temporary Roof & Floor Holes, Wall Openings, Stairways Safety Requirements for, & Other Unprotected Edges in Construction & Demolition Operations
A10.22	Rope-Guided and Non-guided Worker's Hoists – Safety Requirements
A10.24	Roofing Safety Requirements for Low-Sloped Roofs (Chair)
A10.28	Work Platforms Suspended from Cranes or Derricks – Safety Requirements
A10.32 (A10.14)	Fall Protection Systems for Construction & Demolition Operation
A10.43	Confined Spaces in Construction
A10.48	Communication Tower Construction
A14	American Ladder Institute - Committee Member
A14.3	Ladder – Fixed – Safety Requirements
A14.8	Ladder – Accessories – Safety Requirements
Z117.1	Confined Space Safety Requirements (Gen. Industry)
A120	Building Exterior Maintenance Safety Requirements
I-14.1	International Window Cleaning Association (IWCA) Window Cleaning Safety Standard
American Society of Testing Material (ASTM)	
E06.51.25	Skylight Human Impact Resistance Committee, Co-Chair
E06.77	High-Rise Building External Evacuation Devices
F08.16	Archery Products (Hunting Tree Stands)
E58	Forensic Engineering
F13	Pedestrian/ Walkway Safety and Footwear

The American Society of Mechanical Engineers
ASME Steel Stack Access
SAE International
SAE J185 Access Systems for Off-Road Machines
International Organization for Standardization
ISO TC94/SC4 International Fall Protection/ANSI TAG
National Safety Council (NSC) member since 1974
NSC Construction Division, chairman 2012-2014 (1200 Members)
Member of Broad of Delegates 2015-present
OSHA Alliance Program Construction Roundtable NSC representative 2009-present

Nigel Ellis Expertise: 48+ Years safety and human factors experience: Registered Safety Engineer CA/MA, Certified Safety Professional, Certified in Human Factors, scientist, author of textbooks and numerous articles on safety and hazard recognition; labels warnings and instructions expert; safety consulting business development, business agreements relating to safety requirements, safety assessments, developer of safety appliances including ladder improvements, patent holder: safety solutions, developer of safety procedures, eliminator and controller of workplace walking/working hazards,. He typically applies safety principles to potential incidents of sudden energy release that potentially cause injury and property damage. Dr. Ellis' extensive networking in the industry has brought him within reach of many leading experts in related specialties. Dr. Ellis is not only an expert in the performance of fall devices, he is also expert in the placement of these devices for optimal use. This includes scaffolds, towers, roofs, skylights etc. Which are an integral part of any fall protection system and their management including the hierarchy of fall hazard controls.

WORK EXPERIENCE

- 2005 – Present** **President, Ellis Litigation Support, Div. of DSC**
Consult with and assist counsel in personal injury litigation related to falls.
- 2005 – Present** **Management Member, Ellis Fall Safety Solutions, LLC, Div. of DSC**
Fall Protection assessment, engineering, installation and training in the workplace.
- 1985 – Present** **President, Dynamic Scientific Controls, Inc. (DSC)**
Safety Consulting Firm; corporate and OSHA consultation for elevated work safety policy, programs and training, planning of feasible work methods and safety engineering of the workplace. Site visit evaluation of work practice and fall hazard exposure. Fall protection engineering consultant on-site for turnaround, construction and process. Fall protection training classes conducted nationwide. DSC subsidiary Ellis Fall Safety Solutions LLC (EFSS) for Consulting, Engineering and Training and Ellis Ladder Improvements Inc. (ELI) is where Ellis patents are managed. DSC is the parent of Ellis Litigation Support Services (ELS) which provides the technical information on fall cases to clients.
- 1986 - 1996** **C.E.O., Research & Trading Corporation (RTC)**
Safety Equipment Manufacturer. Safety engineering and design of RTC manufactured fall arrest products into the workplace, including human factors, engineering of labels and warning information systems.
- 1970 - 1986** **President, Research & Trading Corporation (RTC)**
Safety Equipment Wholesaler and Manufacturer;
Systems for fall protection and emergency escape from elevated workstations to be engineered into the workplace or buildings.
- 1968 - 1970** **Sales Representative., Addressograph Multigraph**
Vartyper Division; typesetting systems for safety newsletters, reports, engineering drawings, educational and training audio visual facilities.
- 1966 - 1968** **Research Chemist, DuPont Company**
The research and development of high temperature, high strength, fire-retardant thermoplastics additives for industrial engineering applications and safety.

EDUCATION

CERTIFICATION: Board Certified Safety Professional

Specialty: 1. Management Aspects 1984
2. Comprehensive Practice 1992
3. Construction Safety 1994

Certificate Number 7266

Board of Certified Safety Professionals, BCSP, Savoy IL

Vol. recertification phase approved 1990. Formally recertified 1992-20011 (NOTE: CSP curriculum including but not limited to mathematics, chemistry, physics, engineering, applied mechanics, structural design, ergonomics, industrial hygiene, fire prevention/protection, electrical hazards, job hazard analysis, facilities and equipment design, behavioral sciences, safety program planning, legal and regulatory requirements, disaster planning, epidemiology, environmental hazards - full curriculum and maintenance of certification submitted upon request).

Board Certified Professional Ergonomist (1994) (Human Factors)

Certificate Number 675

Board of Certification in Professional Ergonomics,
BCPE, Bellingham WA

Full curriculum and maintenance of certification 2010 available

OSHA Trainer: Fall Arrest Systems 6/91, 9/91, 5/92, 7/92, 4/94

NAFE Fellow, CESB Board Certified Diplomate in Forensic Engineering by NAFE, Certificate Number 485F

National Academy of Forensic Engineers 2/9/94

Alexandria, VA

CESB is the Council of Engineering Specialty Boards

LICENSING

Registered Professional Engineer

Safety Engineering, License #SF003342

Issue Date 1/29/93

Board of Registration for Professional Engineers and Land Surveyors, State of California

Registered Professional Engineer

Safety Engineering, License #37299

Issue Date 3/26/93

Board of Professional Engineers and Land Surveyors; State of Massachusetts

UNIVERSITY

Ph.D., Photochemical Processes

University of Manchester, England (1966)

The research of sunlight-induced reactions of common chemicals to produce complex industrial chemicals and pharmaceuticals by more economical engineering means.

M.Sc., Chemistry

University of Manchester, England (1964)

Curriculum included advanced mathematics, physics and physical chemistry.

B.Sc. Honours Chemistry

University of Manchester, England (1963)

Curriculum included advanced mathematics and organic, inorganic and physical chemistry and physics.

M.S. Industrial Engineering and Safety program partially complete (2007-)

Auburn University, Occupational Biomechanics,

Engineering Economics, Lean Production

Partial completion for requirements of M.S. degree

HIGH SCHOOL

Acklam Hall Grammar School (High School) 1953-1960

Middlesbrough, England (graduated 1960)

ADDITIONAL TRAINING

Aerial Lift Safety Presentation, Jeff Stachowiak, Z359 05/2017

Competent Person Scaffolds, Hands On, Design & Loading, and Suspended Scaffolds Four Day "Train-The-Trainer" certification 25119
Scaffold Training Institute. League City, TX 07/18-21/11

SEAK 18th Annual National Expert Witness Conference, Chicago, IL 06/2010

Standard First Aid, Certificate, American Red Cross of Alaska 2009

"Multimedia Standard First Aid Certificate", American Red Cross
1985, 2009

SEAK 15th Annual National Expert Witness Conference, Cape Cod, MA 06/2007

Daubert Challenges to Forensic Engineering and Scientific Methodologies NAFE
06/2007

Philo "21 hour course "Third Party case development 9/93, 9/94, 9/96, 9/97,
9/99, 9/01, 09/02, 09/15, 09/16, 09/17,09/18

OSHA 10-Hour Construction Course (National Safety Council) 1/97

Full Radiation Worker trained and indexed (NRC Salem II Nuclear Power Station)
6/94

Human Factors Engineering Course, University of Michigan 8/94 (40 hours)

OSHA Fall Arrest Systems Course 6/91, 9/91, 5/92, 7/92, 4/94

Agency and Remedies Courses and Writing, Delaware Law School 6-7/93

Scaffold Erection and Safety 40 hours Course - Purdue University,
Dept of Construction Technology, Calumet, IN 8/91

Architect-Engineer Liability, Cambridge Ins. 1/91

Engineer-in-Training Review Course, University of Delaware, Oct 1990 - April
1991

"Slip and Fall" Seminar, National Academy of Forensic Engineers,
National Society of Professional Engineers conference Minneapolis, MN
1989

"Human Factors" ASSE Consultants Division course by Alphonse Chapanis,
Ph.D. 1988 and also ASSE Construction Division Course (1988) San Francisco
and New York City

"The Management Course" American Management Associations (four weeks)
1980

Other Experience:

ASSE Foundation Research Committee 2009- Present

ASSE Assistant Administrator Engineering Practice Specialty 2006-09

Jewish Community Center (Wilmington, DE) Safety Director 2006-2009

ASSE Engineering Practice Specialty Newsletter "By-Design" 2006-2008

ISFP Founding Member and Co-Chair of Program Committee for ISFP Symposium 2000, Orlando, FL

International Society for Fall Protection (ISFP) Board Member 1988-Present

Patents:

Dr Ellis holds numerous patents on fall-related devices and techniques obtained throughout his career.

8,316,611 B2 Portable Safety Skylight Replacement Assembly
8,122,673 B2 Portable Safety Skylight Replacement Assembly
7,992,681 B2 Portable ladder assembly
7,527,461 Safety rail assembly
6,619,428 Walk-through ladder
6,347,685 B1 Walk-through ladder
6,095,283 Walk-through ladder
4,538,703 Climbing aid and safety descent system
4,458,781 Climbing aid and safety descent device
4,392,555 Fall protection device
8,251,179 B2 Portable Safety Ladder Assembly
D760,9175 Ladder Safety Rail Set
9,540,875 B2 Safety Device for Ladders

Social Media

2012-2019 LinkedIn Articles

PUBLICATIONS

Nov 2012	Three-Point Control Analysis & Recommendations for Climbing Ladders, Stairs & Step Bolts Professional Safety Magazine
Oct 2012	Walk On The Wild Side Fall Equipment selection for Nik Wallenda's stroll across the Horseshoe Falls, Niagara Falls, NY ISHN Magazine
July 2012	Fall Protection for Nik Wallenda's crossing of the Horseshoe Falls, Niagara Falls , NY Modern Safety
Aug 2011	Three Point Control: Analysis and Recommendations American Society of Safety Engineers, ByDesign Newsletter Engineering Practice Specialty
Nov 2009	Skylight Safety in the U.S. American Society of Safety Engineers, By-Design Newsletter Engineering Practice Specialty
Nov 2009	Status of Skylight Safety American Society of Safety Engineers, The Compass Newsletter Management Practice Specialty
May 2008	Recognizing and Responding to Catastrophic Fall Exposures During Truck and Trailer Tarping Operations Professional Safety Magazine
Feb 2008	Assessing Your Fall Protection The Grey House, Safety & Security Directory
Feb 2008	Supermarket Safety The Grey House, Safety & Security Directory
Nov 2007	Drivers Endangered When Covering Truck Loads BNA, Inc. Reporter
March 2006	Fall Protection Is All About Engineering American Society of Safety Engineers, By-Design
Oct 2005	Previously Unknown Fall Hazard Kills Workers Compliance Magazine

Sept 2005	Design Objective: Think Safety Architecture Magazine
Aug 2005	Fall Protection Traps that Workers can't avoid ENR Magazine
Aug 2005	Forensic Engineering Analysis of Nail Extraction Force in Failed Barrier National Academy of Forensic Engineers Vol. XXXII No. 1
June 2005	Don't Cut Off Fall Protection Equipment When Stabilizing The Injuries of Fall Patients Fire Engineering magazine
Feb 2005	Fall Protection Program Guidelines The Grey House, Safety & Security Directory
Feb 2005	The Benefits of Engineered Fall Protection The Grey House, Safety & Security Directory
April 2004	Fall Protection Compliance and Solutions Construction Safety Management and Engineers American Society of Safety Engineers
Feb 2004	Assessing Your Fall Protection The Grey House, Safety & Security Directory
Feb 2004	Fall Protection Program Guidelines The Grey House, Safety & Security Directory
June 2003	Open and disguised holes lead to injury and death www.plantengineering.com
March 2003	Fall Protection and Anchorages Compliance Magazine
March 2003	Engineered Anchorages Trend Continues for Greater Safety Compliance Magazine
March 2003	Engineered Anchorages Trend Continues for Greater Safety Lifting & Transportation International
July 2002	Ask the Expert, Fall Protection Compliance Magazine

July 2002	Predicting Injurious Events Occupational Health & Safety Magazine
March 2002	Safe Anchorage Point Key to Effective Fall Harness BNA, Inc. Reporter
Feb 2002	Ask the Experts Fall Protection Compliance Magazine
Feb 2002	Fall Protection Standards Similar for OSHA, ANSI Questions & Answers Safety & Health
Dec 2001	Playing The Game Of Fall Protection Welding Means Fall Hazards The World Of Welding
Aug 1999	Steel Erection and Related Activities Occupational Health & Safety Magazine
July 1999	Take Control of Fall Hazards Safety & Health Magazine
July 1999	Update on Fall Protection Standards Professional Safety Magazine
June 1999	Using Safety Awards to Promote Fall Prevention Occupational Hazards
Sept 1998	Reviewing Fall Protection in General Industry Compliance Magazine
March 1998	Warning! Check Harness Designs for Proper Protection Compliance Magazine
Jan 1998	The Belt for Fall Protection is Prohibited! ISHN Magazine
July 1997	Fall Protection issue: Hazard Information Newsletter Sierra Vista AZ
April 1996	Summaries of significant recent federal regulations with common- sense commentary on their real-world ramifications. Compliance Magazine
March 1995	Comparison of OSHA Standards old and new,

Compliance Magazine

Oct 1994	Evaluation of OSHA's new Construction Fall Protection Standard, Compliance Magazine
Fall 1994	10 Critical requirements for an anchorage point, Construction Division Newsletter, American Society of Safety Engineers
March 1994	Confined Spaces: Answers to 11 Critical Questions on Fall Protection Programming: Suspenseful Suspension Occupational Health & Safety Magazine
Spring 1994	10 Critical requirements for an anchorage point Consultants Division Newsletter, American Society of Safety Engineers
Feb 1992	Confined Space Fall Protection, Occupational Health & Safety Magazine
Sept 1991	Fall Protection Anchorages, Safety & Health Magazine, National Safety Council
Oct 1990	Changes in the new OSHA Fall Protection Rules Construction Section Newsletter, National Safety Council
April 1990	OSHA's New Fall Protection Rules - contribution and article review Occupational Safety and Health
Jan 1990	Stiffer rules for Fall Protection ahead - contribution and article review Engineering News Record
April 1989	Slips and Falls Occupational Hazards Magazine
March 1989	Maintenance of Fall Protection Systems - making the right connection Safety & Health Magazine
Jan 1988	Suspended Scaffolding: Proper Protection Reduces Injuries Occupational Safety & Health
May 1987	Safety Management, #290 - Fall Hazards are More Serious than You Think
Nov 1986	National Safety Council Constr'n Newsletter Use Fall Protection Devices Safely - Follow Instructions!

April 1985	Fall Protection: Meeting the New Standard Western Oil Reporter
Feb 1985	Protection Systems Curb Death from Falls National Safety News
Jan 1985	Purchasing World, PW Technical File Fall Protection
Dec 1984	Fall Protection - A Systems Approach Reviewing Types of Equipment Industrial Safety & Hygiene News
July 1984	Fall Protection: A Sound Investment pp. 14-16 Well Servicing Magazine
June 1984	Fall Safety Equipment Up to Standards pp. 18-20 The American Oil & Gas Reporter
April 1983	Accidental Falls Cause Consternation: Protection Programs are Needed Northeast Oil Reporter
July 1982	National Safety Council Construction Newsletter Retracting Lifeline can arrest falls comfortably
June 1976	Communication News, Vol. 13, No. 6, pp. 54 Fall Protection for Tower & Antenna Climbers

BOOKS/CHAPTERS AUTHORED

2014	Forensic Engineering Critique of Fall Equipment Selection for Nik Wallenda's walk across the Horseshoe Falls, Niagara Falls, New York. Journal of Nat'l Academy of Forensic Engineering Vol.XXXV111 No. 1
2012	Fourth Edition: "Introduction to Fall Protection" Textbook Updates with latest data, standards, requirements and equipment for addressing falls in workplace. New illustrations and photos. New rope access methods 600 pages
2009	13 th Edition; Accident Prevention Manual
2005-2008	Supermarket Safety The Grey House, Safety & Security Directory
2005	The Benefits of Engineered Fall Protection The Grey House, Safety & Security Directory
2004	Fall Protection Compliance and Solutions Chapter 15 Construction Safety Management and Engineering American Society Of Safety Engineers
2003-2007	Checklists on Assessing Your Fall Protection Program The Grey House, Safety & Security Directory
2003-2008	Fall Protection Program Guidelines The Grey House, Safety & Security Directory
2002	Best's Safety Directory - Checklists on Assessing Your Fall Protection Program
2001	Third Edition: "Introduction to Fall Protection" Reorganized chapters, fall protection engineering focus and standards update 509 pages
2001	12 th Edition; Accident Prevention Manual
1997 - 1999	Best's Safety Directory 36-39th Edition - Checklists on Fall Protection Programs
1996	11th Edition; Accident Prevention Manual Fall Protection Systems, and program development throughout the Manual

1975 -1995	Best's Safety Directory 15th to 34th Ed. (exc 33rd Ed.) "Guidelines on Fall Protection"
1995	Bests' Safety Directory: 34th Ed. "Guidelines on Confined Space Fall Protection and Retrieval"
1994	Second Edition "Introduction to Fall Protection" Updates new OSHA, ANSI and other standards around the world 228 pages
1992	10th Edition; Accident Prevention Manual Fall Protection Systems/Personal Protective Equipment Chapter - review and rewrite
1988	"Introduction to Fall Protection" 1st Edition Textbook Publisher: American Society of Safety Engineers, Des Plaines, Illinois Text book 8 (1/2)" x 11" format 132 pages Provides a methodology for safety planning to provide fall protection in both general industry and construction trades applications. Provides engineering guidelines for helping interact safety professionals with civil engineers working together to plan fall protection for foreseeable fall hazards. Calculations for horizontal lifelines dynamic performance are presented with determination of maximum fall arrest distance and clearances required for proper anchorage point planning.
1988	9th Edition; Accident Prevention Manual
1984, 1992	Fall Protection Tips (second edition 1992) Publisher: Research & Trading Corporation, Wilmington Delaware and Dynamic Scientific Controls, 1992 Provides tips for practical solutions to fall hazard problems in construction and industry.
1973-74	Best's Safety Directory 14th Ed. "Guidelines on Fall Protection"

**DSC FALL PROTECTION TRAINING CENTER
(3-4 day courses)**

INDUSTRIAL AND CONSTRUCTION FALL PROTECTION

Fall Protection Training Center

1990-1999 Instructor for dozens of Courses for Competent & Qualified Persons.

1991 Dr. Ellis and John Newquist jointly developed and presented the first OSHA Training Institute Course for OSHA Fall Arrest Systems, Course#0311

1991-2002 Instructor for dozens of Custom tailored on-site courses for numerous private and government organizations

SEMINARS and TALKS

Since 1985 Dr. Ellis has presented over 100 times to audiences coast to coast

HONORS & AWARDS

2018 NSC Honorary Lifetime Achievement Award
2011 ASSE Thomas F. Bresnahan Medal for Standards Excellence
2010 ASSE 109th Fellow Honor Award
2007 NSC Distinguished Service to Safety Award (DSSA)
2007 ASSE Engineers Practice Specialty By-Design Editor "Most Improved Newsletter" Award by the ASSE Council of Practices and Standards
2006 ASSE Engineers Practice Specialty Newsletter Editor
2007 2005-06 ASSE Engr. Practice Specialty "Safety Professional of the Year"
1990 Listed in National Directory of Safety Consultants - ASSE
1988 NSC Medal - William H. Cameron Award for Safety
1988 Listed in "Who's Who in the East"
1986 American Society of Safety Engineers - elected Professional Member
1985 NSC Medal - William H. Cameron Award for Safety
1985 Listed "Who's Who in Finance and Industry"

MEMBERSHIPS

ASSE Engineering Practice Specialty Asst. Administrator 2007 – 2009

ASSE Engineering Practice Specialty Newsletter Editor 2005-2007

American Ladder Institute A14 Committee 2016 - Present

American National Standards Z359 Committee 1987 -Present (co-founder)

American National Standard ASSE A10 Construction & Demolition Operations Committee Member 2007 – Present

American Society of Safety Engineers, President, Lower Delaware Valley Chapter 1994-1998

American Society of Safety Engineers, 1975; Professional Member, Present
#2183200

American Society for Testing and Materials, F-13 Committee 1999-Present

American Society for Testing and Materials,E06.51.25 Skylight Human Impact
2008-present co-chairman

American Society for Testing and Materials, E58 Forensic Engineering

Delaware Engineering Society, 1993 - Present

Human Factors and Ergonomics Society, Member, 1990 - Present

National Academy of Forensic Engineers #485, 1993- Present

National Association of Tower Erectors NATE 1996-1999

National Safety Council
Constr'n (Sect'n) Division Member, Nat'l Safety Council (1980-1993),1993-
Present

Chairman Construction Division Nat'l Safety Council (2013-2014)

Vice Chairman Construction Division Nat'l Safety Council (2011-2013)

Secretary Construction Division, Nat'l Safety Council (2009-2011)

National Society of Professional Engineers #103414067, 1993-Present

Veterans of Safety, 1990 Member (Board of Directors 2009 - 2012)

Veterans of Safety President 2012-2013

Veterans of Safety Dean of Ambassadors 2013-2014

APPENDIX A

SEMINARS AND TALKS

September 2020	Skylight and Roof Falls: Who Is Responsible Philo 21 Hour Seminar, Detroit , MI
March 2020	Prevent Fall Fatalities with Elimination Techniques ISHN Webinar
September 2019	Ladder Extension w/Three Point Control Climbing Principle Philo 21 hour Seminar, Detroit, MI
September 2019	Ladder Extension w/Three Point Control Climbing Principle National Safety Council Construction Division San Diego, CA
September 2018	Ladder Extension w/Three Point Control Climbing Principle University of MI
September 2018	Ladder Extension w/Three Point Control Climbing Principle Auburn University, AL
September 2018	Ladder Extension w/Three Point Control Climbing Principle Philo 21 hour Seminar
September 2017	Fall Protection: New OSHA Regulations and Update on ANSI 21 Hour Philo Seminar Detroit, MI
September 2017	Fall Protection: New OSHA Regulations and OSHA Update on ANSI Standards BLR Webinar
July 2017	New "OSHA" Regulations on Fall Protection NAFE Atlanta, GA

February 2017	Falling Down on the Job: Fall Protection on Stationary Tank Cars/Trucks: NORA Las Vegas, NV
October 2016	Three Point Control Ladders National Safety Council Congress & Expo Anaheim, CA
October 2016	Fall Protection for Cell Towers/Poles/Rooftops Slips Trips Falls Conference London, UK
October 2016	Fragile Roofs: Skylights/Rooflights Slips Trips Falls Conference London, UK
October 2016	Ladder Extension w/Three Point Control Slips Trips Falls Conference London, UK
September 2016	Fall Protection for Cell Towers/Poles/Rooftops 21-Hour Philo Seminar Detroit, MI
September 2016	Ladder Extension w/Three Point Control Climbing Principle ASSE Delmarva Chapter Salisbury, MD
September 2016	Fragile Roofs: Skylights/Rooflights ASSE Delmarva Chapter Salisbury, MD
June 2016	Fall Protection for Towers/Poles/Rooftops WOSH Newport Beach, CA
April 2016	Fall Protection: Tips for Complying with Tips for Complying with OSHA Sub D and ANSI Z359 Standards BLR Safety Summit Webinar
September 2015	Fall Protection and Safety for Attorneys 21 Hour Philo Seminar Detroit, MI

July 2015	Fall Protection and Safety for Engineers National Academy of Forensic Engineers (NAFE) Special Seminar Seattle, WA
April 2015	Fall Protection for Engineers Pennsylvania Society of Professional Engineers Boot Camp East King of Prussia, PA
Nov 2014	Fall Protection for Engineers U Of Michigan, Ann Arbor, MI
Sept 2014	A New Means To Improve Elimination and Fall Hazard Control American Society of Safety Engineers Annual PDC, San Diego, CA
Sept 2014	Fall Protection for Engineers Pennsylvania Society of Professional Engineers, Harrisburg, PA
June 2014	Forensic Engineering Critique of Fall Equipment Selection for Nik Wallenda's walk across the Horseshoe Falls, Niagara Falls, NY Journal of National Academy of Forensic Engineering Vol. XXVIII No.1
May 2014	Why Holding Ladder Rungs at Heights may Save your Life PacRim Conference Honolulu, HI
May 2014	Three Point Control, Research into Gripping Ladders and Grab Bars, Emerging Issues in Stairway Usability and Safety Toronto, Canada
April 2014	Emerging Issues in Fall Protection, BLR Safety Summit, Atlanta, GA
June 2013	Futuristic Fall Protection Now American Society of Safety Engineers Annual PDC, Las Vegas, NV
June 2013	Three Point Control – Analysis and Recommendations International Fall Protection Symposium Las Vegas, NV
Mar 2013	How To Protect your Organization from Fall Protection Litigation Indiana Safety & Health Conference Indianapolis. IN
May 2013	Human Factors Engineering for a Walk over the Falls, Fall Protection for Nik Wallenda Human Factors Engineering Society Southampton, PA

Feb 2013	Planning for a Walk over Niagara Falls: Fall protection for Nik Wallenda's National Safety Council Construction Division Washington DC
Jan 2013	Forensic Engineering for a Walk over the Falls: Fall protection for Nik Wallenda's Walk National Academy of Forensic Engineers (NAFE) Special Seminar Newport Beach, CA
June 2012	How to Protect your Organization against Fall Protection Litigation American Society of Safety Engineers Annual PDC, Denver, CO
Apr 2012	Three Point Control - Analysis and Recommendations PacRim Conference Honolulu, HI
Feb 2012	Fall Protection Criteria, Systems, Engineering Fall Protection Safety Workshop NE Region Construction., Worcester, MA
Oct 2011	Fall Protection: Fabricate your Own or Purchase National Safety Council Congress & Expo., Philadelphia, PA
June 2011	"OSHA" Construction and Industry Working Ever Closer Together on Fall Protection American Society of Safety Engineers Annual PDC Chicago, IL
May 2011	Evolving Fall Protection Standards and Litigation and Presentation of the Society Fellow Award American Society of Safety Engineers, Philadelphia Chapter
May 2011	Hazard Analysis the Dave MacCollum Way Veterans of Safety
Oct 2010	Fall Protection Compliance Options National Safety Council Congress & Expo., San Diego, CA
June 2010	How to Apply the Latest Developments in Fall Protection to Your Site American Society of Safety Engineers Annual PDC, Baltimore, MD
June 2010	Update on a Dynamic Test Standard for Skylight Human Impact International Fall Protection Symposium. Baltimore, MD
Apr 2010	Roof Fall Hazard Experiences Roofers and Waterproofers Research & Education Joint Trust St. Louis, MO

Mar 2010	Roof Fall Hazard Experiences Roofers and Waterproofers Research & Education Joint Trust Minneapolis, MN
Jan 2010	Advances in Roof Fall Protection Planning Mid-America OSHA Education Ctr., ABC Dayton, OH
Oct 2009	Advances in Roof Fall Protection Planning American Hotel Lodging Association Kansas City, MO
Oct 2009	Advances in Roof Fall Protection Planning National Safety Council, Orlando, FL
Aug 2009	Making Fall Protection Work at Your Site American Society of Safety Engineers, San Antonio, TX
Aug 2009	New Developments in Fall Protection Planning using ANSI Z359-2007 Veterans of Safety
Feb 2009	Fall Protection Advances in Construction World of Concrete Las Vegas, NV
Aug 2008	New Developments in Fall Protection Planning, ANSI Z359-2007 ORC Worldwide Washington, DC
June 2008	Qualified Person Duties to Create a Fall Protection System Meeting Z359 Las Vegas, NV
June 2008	Truck Falls, Fall Protection Symposium, Las Vegas, NV
Feb. 2008	Roofers and Waterproofers Research & Education Joint Trust Achieving 100% Fall Protection in Roofing, Portland, OR
Jan 2008	What Lawyers need to know about Fall Protection Engineering. CLE (National Continuing Legal Education) Vail, CO
Oct 2007	Fall Protection for Stationary Vehicles National Safety Council, Chicago, IL

Aug 2007	Design of Ladders and Grab Bars for Effective Fall Solutions International Conference on Slips, Trips and Falls Hopkinton, MA
June 2007	New Developments in Fall Protection Planning American Society of Safety Engineers, PDC Orlando, FL
Mar 2007	American Society of Safety Engineers Philadelphia Chapter Fall Hazards- Can you Recognize Them?
Mar 2007	Roofers and Waterproofers Research & Education Joint Trust Achieving 100% Fall Protection in Roofing Minneapolis, MN
Feb 2007	Safety Design Principles Natural Hazard - Gravity 17 th Annual Construction Safety Conference & Exposition
Feb 2007	Roofers and Waterproofers Research & Education Joint Trust Achieving 100% Fall Protection in Roofing
Nov 2006	Fall Protection Engineering Avoids System Failure National Safety Council San Diego, CA
June 2006	Fall Protection in General Industry where no OSHA regulations apply American Society of Safety Engineers, PDC Seattle, WA
June 2006	What's next for Fall Protection? International Fall Protection Symposium (ISFP) Seattle, WA
Mar 2006	"Fall Protection for Plant Engineers and Facility Managers" National Manufacturing Week Conference Stephens Convention Center in Rosemont, IL
Sept 2005	The Responsibility of Management or Worker? National Safety Council 93rd Congress & Expo, Orlando, FL
June 2005	Fall Protection – "Engineered" is Best but is "Do Your Best" an Option? American Society of Safety Engineers Annual PDC, New Orleans, LA
Jan 2005	Nail Extraction Force in Failed Barrier National Academy of Forensic Engineers, San Diego, CA

Sept 2004	Engineered fall safety: How to Sell It Internally National Safety Council 92 th Congress & Expo, New Orleans, LA
June 2004	Fall Protection for Your Small Contractors American Society of Safety Engineers Annual PDC, Las Vegas, NV
Mar 2004	Reducing Fall Injuries and Deaths Through a Hierarchy of Controls 2004 Construction Safety Conference & Expo., Randolph, MA
Oct 2003	Truck Driver Fall Protection XL Environmental, Exton, PA
Sept 2003	Fall Protection Implementation and Verification National Safety Council 91 th Congress & Expo Chicago. IL
Sept 2003	Fall Protection for Holes and Disguised Holes International Fall Protection Symposium, Chicago, IL
July 2003	Fall Protection Focus Day American General Contractors of San Diego, CA
June 2003	Fall Protection for Difficult Exposures, American Society of Safety Engineers Annual PDC, Denver. CO
Feb 2003	Hazard Information Foundation Inc. (HIFI) Safety Workshop Why Fall Protection Programs Fall Through the Cracks
June 2002	Fall Protection for Engineers National Safety Council 90 th Congress & Expo., San Diego, CA
Apr 2002	Reducing Fall Injuries Means Profitability for Clients. Independent Insurance Agents Dover, DE
Apr 2002	Case Histories of Fall Protection Engineering for Roofs and Warehouses American Society of Safety Engineers Annual PDC, Nashville, TN
Mar 2002	Harnesses Provide Appearance of Safety; Anchorage Points Must Be Provided, BNA, Occupational Safety & Health
Jan 2002	Construction Fall Protection American Society of Safety Engineers Philadelphia PA Chapter

Jan 2002	Home and Business Fall Hazards and What you need to know about the Danger of Falling and what you can do about it Cedar Rodney Rotary Club, Wilmington, DE
June 2001	What is a Fall Hazards? American Society of Safety Engineers, Philadelphia, PA
Mar. 2001	Fall Protection for Safety Professional, Oregon Governor's Occupational and Safety Health Conference
June 2000	What is Fall Protection? American Society of Fall Protection, Annual PDC Orlando, FL
Jan 2000	Fall Accident Reconstruction, National Association of Legal Investigators, Mid Year Meeting, Orlando, FL
Apr 1999	National Association of Investigators Fall Protection for Investigation
Sept 1998	How the US Legal System Affects Fall Protection Product Design: International Fall Protection Symposium in Wuppertal (IFPS'98)
Feb 1998	Elimination of Fall Hazards on Jobsites: BuildSafe '98, Construction Safety Councils, Chicago, IL
Feb 1997	Fall Protection Standards, Associated General Contractors of America, National Safety Council, Construction Division, Sacramento, CA
Sept 1996	Developing a Effective Fall Protection Program; PDC Region 1X Williamsburg, VA
Feb 1996	When the Fall Protection System Failed., American Society of Safety Engineers, LDVC, Wilmington, DE
Sept 1995	Fall Protection Subpart M and proposed General Industry regs, Lancaster County Industrial Safety Council
Mar 1995	Fall Protection - the new Construction standard, American Society of Safety Engineers, LDVC, Prof. Dev. Conf, Philadelphia, PA
Mar 1995	New Standards for Fall Protection, American Society of Safety Engineers, Calumet Chapter PDC, IN
Feb 1995	Anchorage Point critical requirements - National Safety Council, Construction Division, Atlanta, GA

Feb 1995	Foundations for Fall Protection - Builders Exchange & Rochester Safety Council, Rochester, NY
Feb 1995	Fall Protection Solutions Hierarchy, America West Safety & Health Expo, Sacramento, CA
Dec 1994	Principles of Fall Protection - Argonaut Insurance Company, Valley Forge, PA
Oct 1994	Fall Protection Training - Current American Perspective, International Fall Symposium, San Diego CA
June 1994	Elements of a Fall Protection Program, American Foundryman Society, Des Plaines, IL
Apr 1994	Integrating Fall Protection into Construction Work Methods, Pacific Rim Safety Conference, Honolulu HI
Jan 1994	New Directions in Fall Protection public seminar; Los Angeles, CA
Nov 1993	Fall Protection and Confined Space Solutions, public seminar; Atlanta GA
Sept 1993	Fall Protection and Confined Space Solutions, public seminars; Freeport TX
Aug 1993	Fall Protection Methods in Construction Chicagoland Construction Association, Chicago IL
Aug 1993	Fall Protection and Confined Space Solutions, public seminar; Seattle WA
July 1993	Fall Protection/Prevention - Ideas for the 1990's All-Ohio Safety Professional Development Conference, Akron Ohio
May 1993	A comparison of the fall protection methods and regulations developed in Europe and North America - 3rd EuroAmerican Construction Conference, Glasgow, Scotland
Apr 1993	Fall Protection for the '90's Southeast Safety & Health Conference, Georgia Tech., Atlanta GA
Feb 1993	WATtec '93 1. Fall Protection for the Nineties 2. Fall Arrest Systems to minimize injury potential; Nashville TN

Dec 1992	Fall Protection Systems - Proper Use & OSHA Update Safety Council of the Louisiana Capital Area
June 1992	Latest OSHA developments in fall protection: Maui Safety Association, Hawaii, HI
May 1992	Fall Protection methods for welders American Welding Society, Delaware Chapter
Apr 1992	Fall Protection skills for safety professionals Indiana- University of Pennsylvania, Safety Systems Course
Oct 1991	Fall Protection is Profitable - there's proof! Tri State Safety Council Chicagoland Construction Safety Council Chicago, IL
Oct 1991	OSHA Fall Protection Standards are Profitable American Society of Safety Engineers, Chesapeake Chapter, Baltimore, MD
July 1990	Fall Protection for Chemical Process Towers: The responsibility of supervisors and managers for planning Occidental Chemical Corp. Corpus Christi, TX
May 1990	100% Fall Protection at Heights and in Confined Spaces Amoco Health and Safety Conference, Itasca, IL
May 1990	Fall Protection Standards 22nd Governor's Safety & Health Conference Woodlawn, MD
Apr 1990	Current Issues in Fall Protection: Western Pennsylvania Safety Council, Monroeville, PA
Apr 1990	Inherently reliable Fall Arrest and Controlled Descent Equipment for Rescuers: COLLAPSE '90, Pennsville, NJ
Feb 1990	The New Fall Protection and Confined Space Standards ASSE Gold Coast Chapter, Boynton Beach, FL
Feb 1990	A Guide to becoming an Expert Witness ASSE Lower Delaware Chapter, Concordville, PA
Feb 1990	Trends and techniques in Fall Protection: an update of the national standards ASSE PDC Full day meeting, sponsored by ASSE Allegheny Chapter, Monroeville, PA

Sept 1989	Refinery Fall Protection and Confined Space Safety, Baton Rouge, LA
Sept 1989	Fall Protection Methods, Longview, TX
Sept 1989	Confined Space Fall Protection and Retrieval Dallas, TX
Sept 1989	New OSHA Fall Protection Standards, Pasadena, TX
Sept 1989	Train the Trainers in Fall Protection, Exxon Chemicals, Baytown
Sept 1989	ALCOA - Introduction of Fall Protection Policy, Davenport, IA (2½ day seminar program)
Sept 1989	ALCOA - Introduction of Fall Protection Policy, Knoxville, TN (2½ day seminar program)
Sept 1989	Competent Person's role in Fall Protection National Petroleum Refiners Association Annual Meeting, Houston, TX
May 1989	Fall Protection for Roofers and other contractors, Phoenix, AZ
May 1989	New OSHA Fall Protection Standards, Pasadena, TX
May 1989	Fall Protection Solutions - Beyond the Harness, Exxon Refining Baytown, TX
Apr 1989	Slip, Trip and Fall Protection, Tristate Safety Council, Frederick, MD
Dec 1988	Fall and Slips, ASSE Chapter, Harrisburg, PA
Oct 1988	ISO International Fall Protection Seminar Panelist, Orlando, FL
May 1988	Fall Protection in Electrical Utility Operations, Edison Electric Institute, Savannah, GA
Mar 1988	OSHA 1926 Subpart M Construction Hearing testimony
Mar 1988	Fall Prevention at the Worksite Texas/Southwestern Safety Conference, Dallas, TX
Oct 1987	Fall Prevention - Techniques and Systems, 75th National Safety Congress, Blockbuster Session, ATM Section, Chicago, IL
Sept 1987	Fall Protection in the Chemical Plant Environment, Freeport, TX

Sept 1987	Preventing Injuries from Use of Fall Protection Equipment, Edison Electric Institute, Seattle, WA
Jul 1987	New Fall Protection for the Construction Industry, CNA Insurance Co., Chicago, IL
Apr 1987	New Ideas in Elevated Fall Protection and Confined Space Entry and Retrieval, Southern Pulp and Paper Safety Association, Greensboro, NC
Mar 30-Apr 1987	The New Fall Protection, Seattle, Spokane, WA
Feb 1987	Fall Protection for Suspended Scaffold Users, Honolulu, HI
Feb 1987	New Approaches to Elevated Fall Protection, Honolulu, HI
Oct 1986	Planning Safety at Elevation: The Latest in Fall Protection, 74th National Safety Congress, Public Utility Section, Chicago, IL
Sept 1986	The New Fall Protection, Kingsport, Chattanooga, TN and Atlanta
Sept 1986	Fall Protection in Construction, CNA Insurance Co. Chicago, IL
June 1986	Fall Protection, NSC Construction Section Meeting, Boise, ID
May 1986	The New Fall Protection, Los Angeles, San Francisco, CA
May 1986	The New Fall Protection, Annual Eastern Pennsylvania Safety Conference, Allentown, PA
May 1986	The New Fall Protection, Detroit, MI, Chicago, IL, Milwaukee, WI
Apr 1986	The New Fall Protection, ASSE PDC, Philadelphia, PA
Apr 1986	The New Fall Protection, New Jersey Safety Conference, Atlantic City, NJ
Feb 1986	OSHA Power Platform Hearing testimony, Chicago, IL
Feb 1986	100% Elevated Fall Protection, ASSE 1/2 day Seminar
Jan 1986	The New Fall Protection, ASSE, Colonial Virginia Chapter, Richmond, VA

Oct 1985	Fall Protection - Are You Prepared?, Governor's Safety Conference, Anchorage, AK
Sep 1985	The New Fall Protection, ASSE. McKinley Chapter, Barberton, OH
July 1985	The New Fall Protection, Philadelphia, PA. Naval Shipyard
May 1985	The New Fall Protection, Seattle, WA
May 1985	The New Fall Protection, Richland, WA
May 1985	Fall Protection - The Most Underused Safety Resource in America, W. New York Safety Conference, Buffalo, NY
Feb 1985	The New Fall Protection, Birmingham, Mobile AL, Baton Rouge, Lafayette, LA
Feb 1985	Falls Can Be Prevented, Delmarva Safety Conference, Salisbury, MD
Jan 1985	The New Fall Protection, Shreveport, LA, Borger, Amarillo, Longview, TX

10:09 AM
10/14/20

Robert Pahlke Law Group-Justin Moore Case

All Transactions

Type	Date	Num	Invoice	Paid	Balance	Retainer	Retainer
			Amount	Amount		Balance	Hours
Invoice	03/26/2019	R21904	6,000.00		6,000.00	6,000.00	15.00
Payment	03/26/2019	7189		6,000.00	0.00		
Invoice	03/06/2020	200008	0.00		0.00	-912.55	-2.25
Invoice	06/11/2020	200026	0.00		0.00	-900.00	-2.25
Invoice	08/21/2020	200040	4,578.18		4,578.18	-4,187.45	-10.50
Invoice	08/27/2020	200043	600.00		5,178.18		
Payment	09/28/2020	7495		5,178.18	0.00		
			<u>11,178.18</u>	<u>11,178.18</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
TOTAL			<u><u>11,178.18</u></u>	<u><u>11,178.18</u></u>	<u><u>0.00</u></u>	<u><u>0.00</u></u>	<u><u>0.00</u></u>

Deposition/Trial/Arbitration testimony provided by Dr. J. Nigel Ellis

1. Bradford Kemp v. Leigh Fibers, Inc., The United States District Court for The District of South Carolina Spartanburg Division, Case No. 7-19-cv-1234-TMC - deposition 09/23/20
2. Brendon J. McClanahan , Estate of Timothy J. McClanahan v. Priority 1 Air Rescue Operations, Et al U.S.D.C. District of Delaware. Case No. 19-cv-01237-CFC, - deposition 07/21/20
3. Robert Timothy Short v. City of Dardenne Praire, et al, Circuit Court of St Charles County 11th Judicial Circuit, State of Missouri . Case No. 1611-CC00807 05/21/19 – deposition 05/21/19
4. Andrea Saris v Overhead Door Corporation, Eastern District of Virginia Richmond Division, Case No. 3:17cv818 – deposition 10/19/18
5. Jo Ann Martinez v. JLG Industries, Inc., OSHKOSH Corporation, Raymark Air Conditioning & Heating, Inc. In The 218st District Court, Harris County, TX. Case No. 2017-01264 - deposition 05/09/18
6. Christopher and Kerri Clanton v. XP Systems Corporation, Fiserv, Inc. Sleep Technology. Superior Court of the State of California, County of Ventura, Case No. 56-2016-00481127-CU-PO-VTA - deposition 02/16/18
7. Eduardo Narciso De La Cruz v. Frontline Concrete Pumping; HADCO Construction, LLC., Judd Ron Peck and John David Trease. Fourth Judicial District Court Utah County, State of Utah. Case No. 140401658 –deposition 01/16/17

Compiled 10/2005, update 09/24/20